SMITHSONIAN
Zoogoer
For members of **FRIENDS OF THE NATIONAL ZOO**
MARCH | APRIL | 2013

HEFTY Housewarming

The Zoo's Asian elephants have a stunning new habitat.

» **Bear Baby Bonanza**
» **Probing into Poop**
» **American Alligators**

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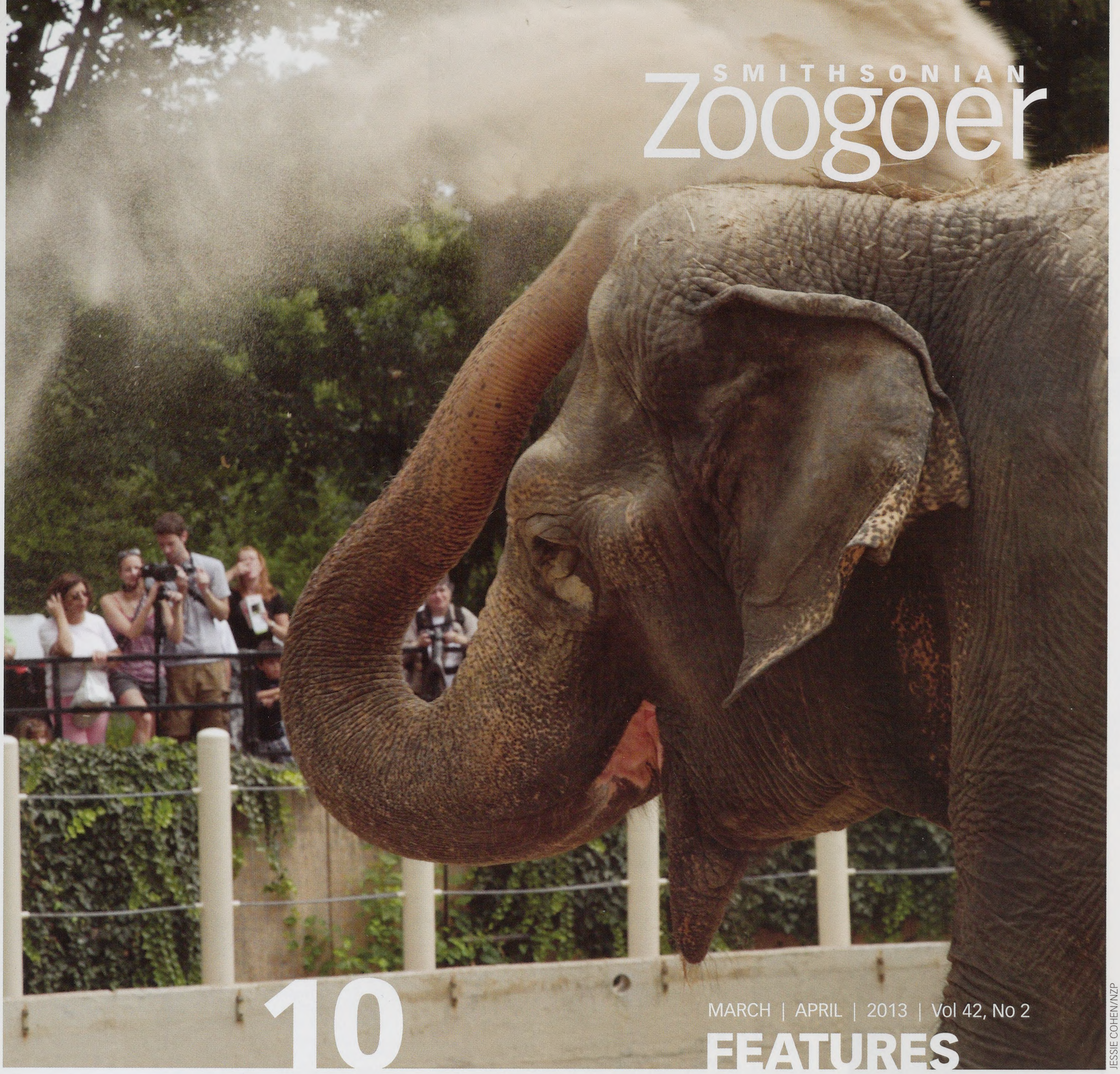

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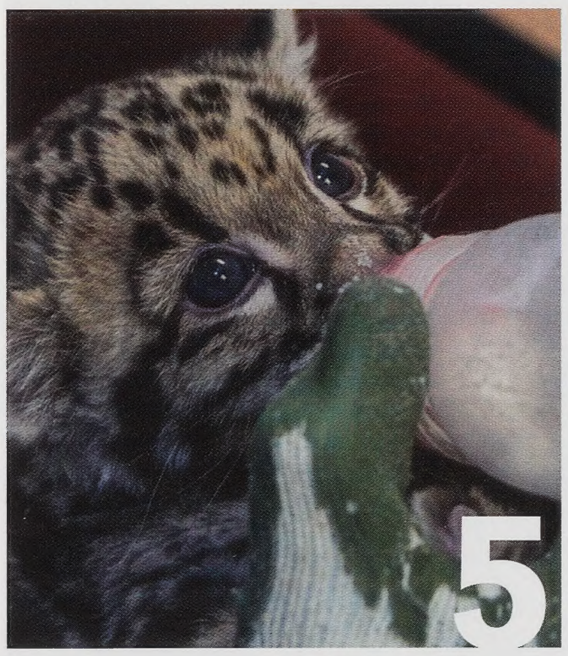

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FONZ Friends of the National Zoo is the dedicated partner of the Smithsonian's National Zoological Park. FONZ provides exciting and enriching experiences to connect people with wildlife. Together with the Zoo, FONZ is building a society committed to restoring an endangered natural world. Formed in 1958, FONZ was one of the first conservation organizations in the nation's capital.

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Membership in FONZ supports the animal care, conservation, and educational work of the Smithsonian's National Zoo. It also offers many benefits: a Smithsonian Zoogoer subscription, discounts on shopping and events, discounted or free parking, and invitations to special programs and activities. To join, call 202.633.3034, or visit **fonz.org/join.htm.**

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On the cover: The Zoo's elephants have a new home.
PHOTO BY ANN BATDORF

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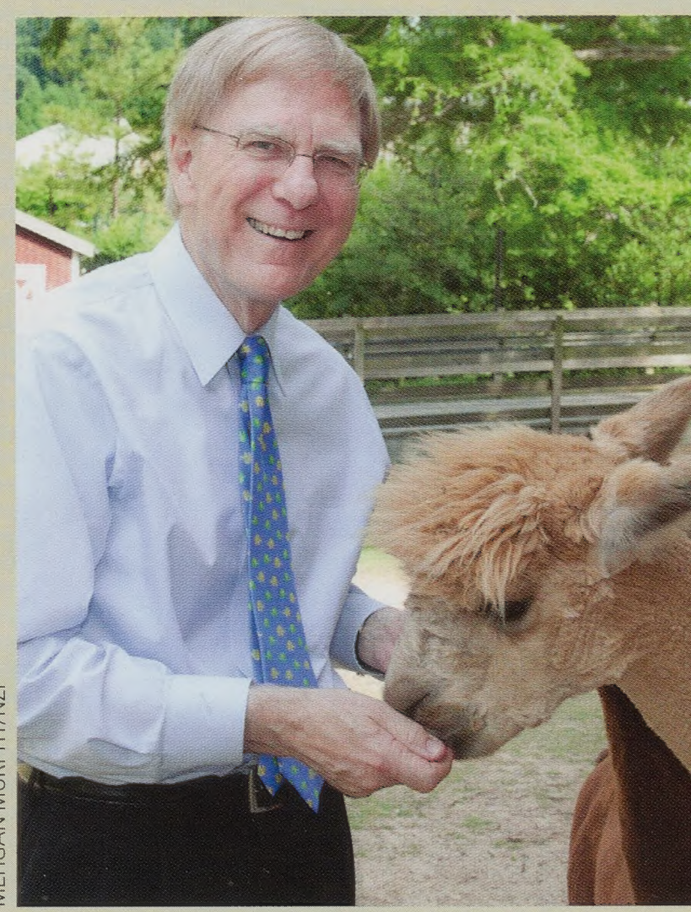
LIVING LEGACY

IN THE MID-1950S, WHEN THE NATIONAL ZOO WAS DESPERATELY IN NEED OF NEW RESOURCES to pursue and further its mission, a group of concerned citizens came together to offer assistance to the Zoo's director, Dr. Ted Reed.

The tiny group's members knew they needed a skilled leader: someone who could navigate the obstacle course of both federal and local politics. Their choice was Max Kampelman, a young attorney and key aide to Senator Hubert Humphrey. Away on a business trip, Max had no opportunity to point out that he was too busy. "To this day," he recalled in 2008, "I don't know exactly how I was selected!"

After being appointed in his absence to lead the new group and despite an already crowded agenda, Max dove into the task with gusto. In his savvy manner, he worked with Smithsonian leaders to shore up the Zoo's funding and to suggest to the Smithsonian that a dedicated nonprofit partner was needed to generate revenue and provide additional services to advance the Zoo's mission. Thus, Friends of the National Zoo was born.



MEHGAN MURPHY/NZP

Max Kampelman's storied later career as a diplomat is well known to those who follow U.S. foreign policy. He was lauded for significant diplomatic achievements in taming the arms race through U.S.-Soviet arms reduction agreements and for the landmark accords that facilitated human rights advances in Soviet-bloc countries. He will be remembered as a pivotal figure in bringing an end to the Cold War on terms favorable to this nation.

Even though his diplomatic impact reached around the world, FONZ continued to hold a special place in Max's heart. He marveled that FONZ had grown into a robust, 40,000-member organization, and was delighted by the wide variety and depth of support it provides to the Zoo and to FONZ members. He was thrilled to see the evolution of the Zoo with its focus on the conservation of threatened and endangered species.

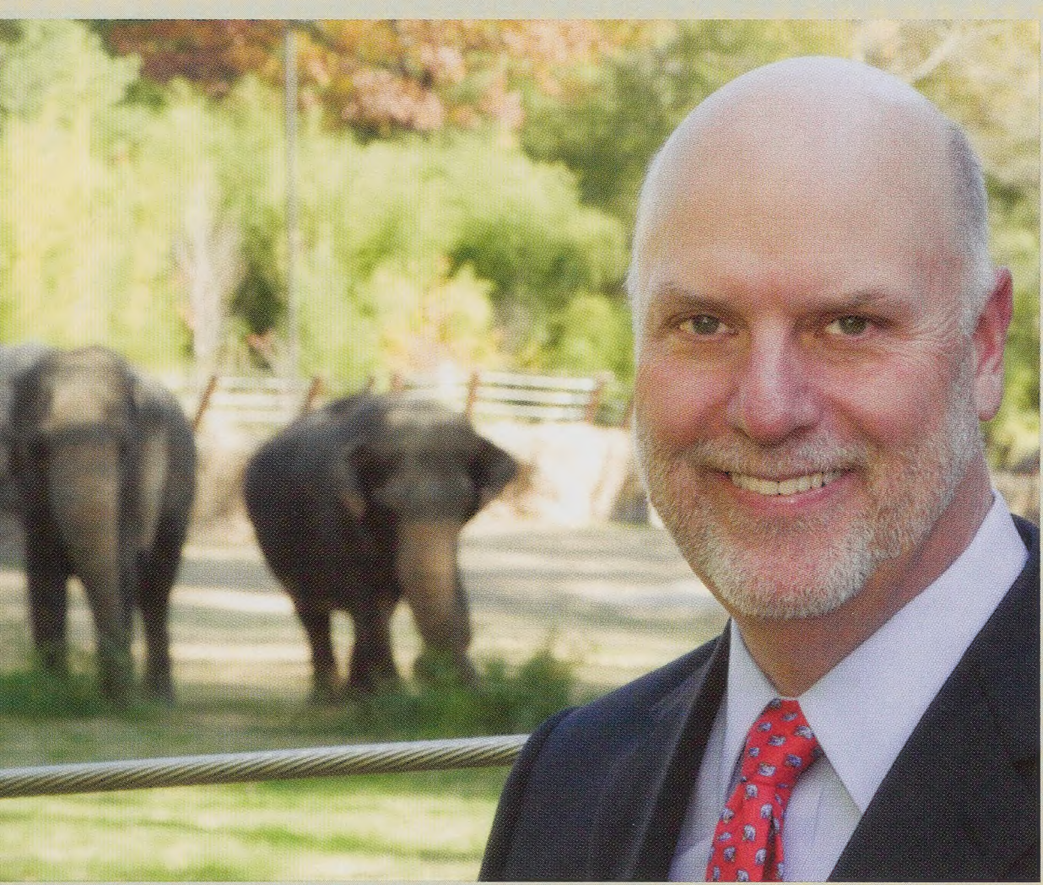
Today, we stand in the long shadow of a man who believed that when individuals come together for purposes larger than themselves, they can make a real difference. Certainly he did, and that is why Max's life, which drew to a close earlier this year, continues to inspire us today.

Sincerely,

Bob Lamb

Bob Lamb
Executive Director, Friends of the National Zoo

A GIANT STEP



MEHGAN MURPHY/NZP

YEARS AGO, THE SMITHSONIAN'S NATIONAL ZOO ENDEAVORED TO REDEFINE ASIAN ELEPHANT CARE. On March 23, 2013, the doors to our state-of-the-art Elephant Community Center opened to the public, completing the final component of our Elephant Trails exhibit.

We designed the Elephant Community Center with the best interests of Ambika, Shanthi, Kandula, and a larger herd in mind. But we also wanted to offer our visitors an exceptional experience. With this center, we've crafted an intimate environment where visitors can view the elephants better than ever before. Interactive exhibits fill the walls, welcoming you to explore exactly what makes an elephant an elephant, from their physical traits and behaviors, to how much they weigh, eat, sleep, and even poop! We are elated that our elephants' new home was so instantly and warmly received by our neighbors here in Washington and those who visit from all over the world.

It is important that visitors of all ages make a connection to these magnificent creatures, but our ongoing commitment to provide the best care for our elephants is what makes us truly proud of Elephant Trails. The exhibit ensures our large friends have ample space for socializing, training, and playing. Features, such as rubber and sand flooring are designed to protect the elephants' sensitive toes and feet. A splash pool, an elephant-activated shower, and naturalistic toys serve to enrich our elephants' lives and encourage natural behaviors.

With species vanishing from our planet every day, the need to conserve all biodiversity has never been more urgent. Elephant Trails' facilities will improve our ability to research and better understand these remarkable animals. Our National Elephant Herpesvirus Laboratory, in collaboration with Johns Hopkins University and the Endocrine Research Laboratory in our Smithsonian Conservation Biology Institute, works every day to better understand this disappearing species.

At the National Zoo, we're not only concerned about animals; we're also invested in our environment. We designed the Elephant Community Center to meet the highest Leadership in Energy and Environmental Design standards set by the U.S. Green Building Council. Forty geothermal wells regulate heating and cooling, operable skylights optimize energy performance, and a green roof system reduces storm water runoff and provides additional insulation. We hope our efforts to conserve all forms of biodiversity will resonate with you and inspire you to take similar green steps toward saving species.

Of course, an undertaking of elephantine proportions such as this would not be possible without the support of friends like you. Thank you for buying bricks, stuffing the donation box at the Homer and Martha Gudelsky Elephant Outpost with your dollars, buying the elephant Adopt a Species packages, taking a private tour of the elephant barn, and supporting us in so many ways. This state-of-the-art exhibit is not only a giant step toward conservation, it also gives our elephants and their wild cousins the hope of a promising future.

Sincerely,

Dennis Kelly
Director, Smithsonian's National Zoological Park

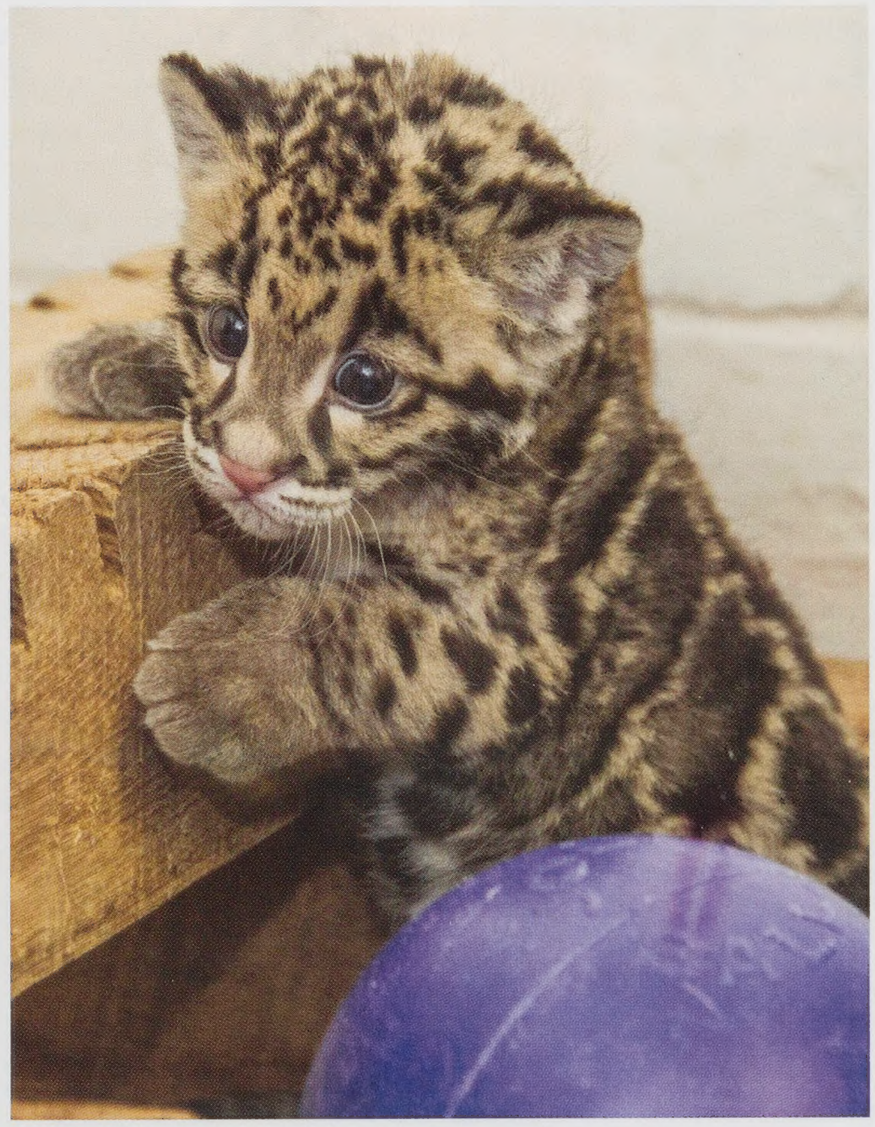
JANICE SVEDA

Clouded Leopard Cubs

February brought a welcome event to the Smithsonian Conservation Biology Institute: the birth of two clouded leopard cubs. These two cubs—the Zoo's fourth clouded leopard litter since 2009—will help ensure the genetic diversity of the clouded leopard population in North America. Energetic, active, and healthy, the cubs will stay at SCBI until they are about three and a half months old. They will then move to other zoos for eventual breeding, as recommended by the Species Survival Plan.

Clouded leopards are native to the forests of Southeast Asia, from Thailand and the Malay Peninsula to the foothills of the Himalaya. Wild populations have been decimated by poaching and deforestation, and the clouded leopard is considered vulnerable to extinction.

SCBI is a leader in clouded leopard breeding and conservation, and has welcomed the birth of 70 cubs in the past 30 years. In addition to focusing on the SCBI breeding program, the National Zoo is also working with the Nashville Zoo, the Thailand Department of National Parks and Wildlife, and the Clouded Leopard Species Survival Program to develop a successful clouded leopard breeding program for Thai zoos.



JANICE SVEDA

Is Bigger Better?

RAYMOND DANNER/NZP

RAYMOND DANNER/NZP

Beak size may matter when it comes to attracting mates and out-competing rivals, according to a recent paper published in *Ecology and Evolution* by Russel Greenberg and Raymond Danner of the Smithsonian Conservation Biology Institute (SCBI) and Matthew Etterson of the U.S. Environmental Protection Agency.

"Traditionally, we've viewed bill size in terms of how it helps birds eat," said Greenberg, head of SCBI's Migratory Bird Center and paper co-author. "By looking at the infrastructure of bird bills using X-rays, we discovered that male bill sizes change seasonally, suggesting that bills play a role in mating and fighting as well."

The three scientists studied thousands of digital x-rays of the horny bills from two subspecies of tidal marsh sparrows. The results showed that there were significant differences in bill size based on season and sex; bills are at their largest in late spring to early summer—mating season for this species—and males tend to have larger bills than females.

New Zealand Honors Kiwi Keeper

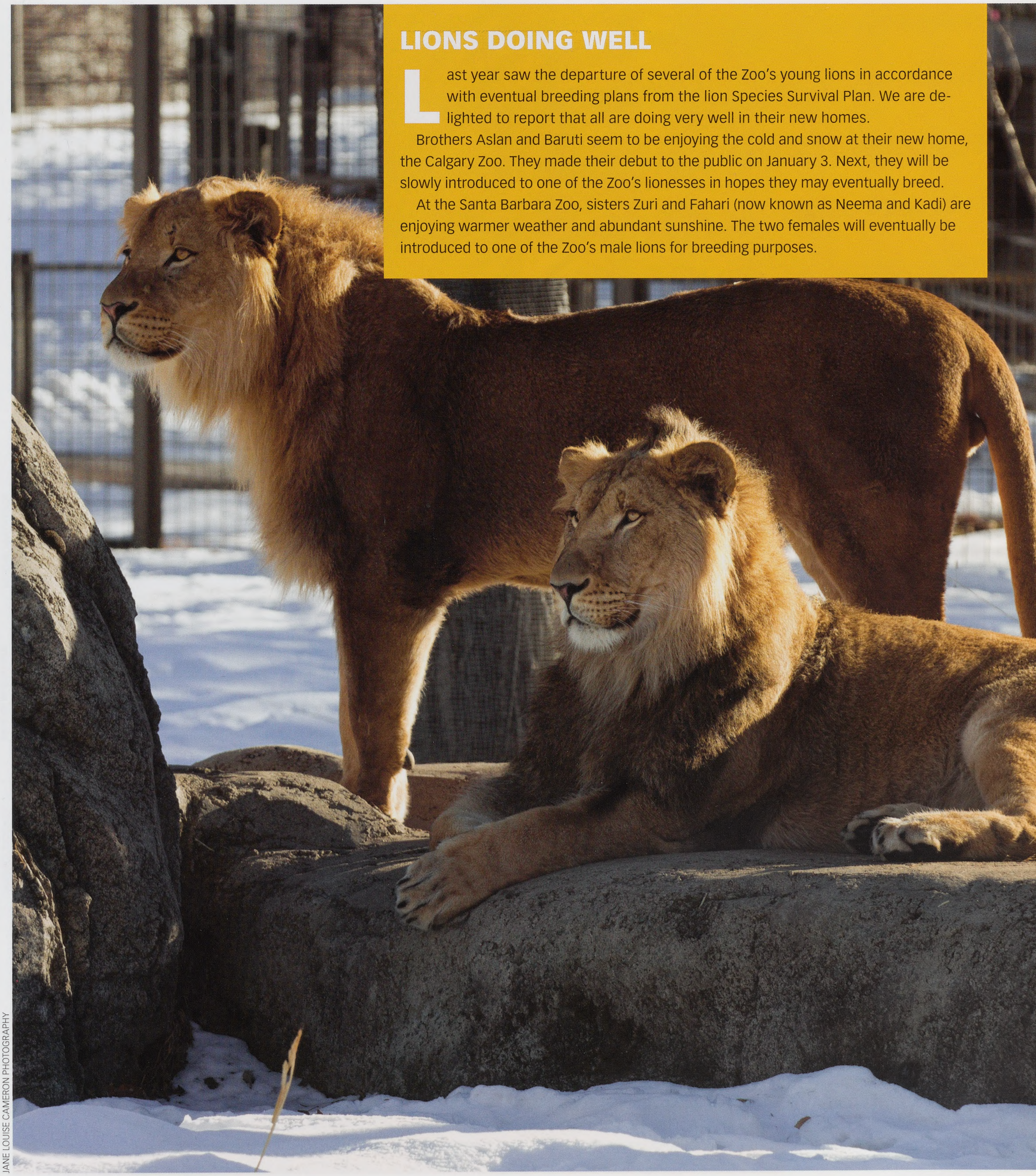
KATHY BRADER began her career as an Animal Keeper in the Zoo's Bird House in 1986. Since then, she has led the Zoo's efforts to breed, care for, and educate the public about kiwis. Today, the Zoo is a leader in kiwi conservation and captive breeding largely due to Brader's efforts.

New Zealand's Prime Minister, John Key, honored Brader's devotion to kiwis by appointing her an Honorary Member of the New Zealand Order of Merit on January 1, 2013. He recognized her devotion to kiwi public education and outreach, as well as her success in breeding these unique birds and propagating the species.

Working closely with the New Zealand Embassy and New Zealand Department of Conservation, Brader and the National Zoo strive to maintain and conserve the well-being of the world's kiwi population. Since 2005, Brader has served as the Species Survival Plan coordinator and studbook keeper for all brown kiwis outside New Zealand. In this role, she matches kiwis and their mates by considering factors such as health, sexual maturity, and breeding capability. Brader was also instrumental in creating the Zoo's Meet a Kiwi program, the only such opportunity for visitors to observe these birds up close in the United States.

Only five zoos outside of New Zealand have successfully bred these unique birds. Under Brader's care and instruction, the Zoo successfully hatched and raised six kiwis—three males and three females—between 2005 and 2012.

MEHGAN MURPHY/NZP



LIONS DOING WELL

Last year saw the departure of several of the Zoo's young lions in accordance with eventual breeding plans from the lion Species Survival Plan. We are delighted to report that all are doing very well in their new homes.

Brothers Aslan and Baruti seem to be enjoying the cold and snow at their new home, the Calgary Zoo. They made their debut to the public on January 3. Next, they will be slowly introduced to one of the Zoo's lionesses in hopes they may eventually breed.

At the Santa Barbara Zoo, sisters Zuri and Fahari (now known as Neema and Kadi) are enjoying warmer weather and abundant sunshine. The two females will eventually be introduced to one of the Zoo's male lions for breeding purposes.

JANE LOUISE CAMERON PHOTOGRAPHY

MEHGAN MURPHY/NZP

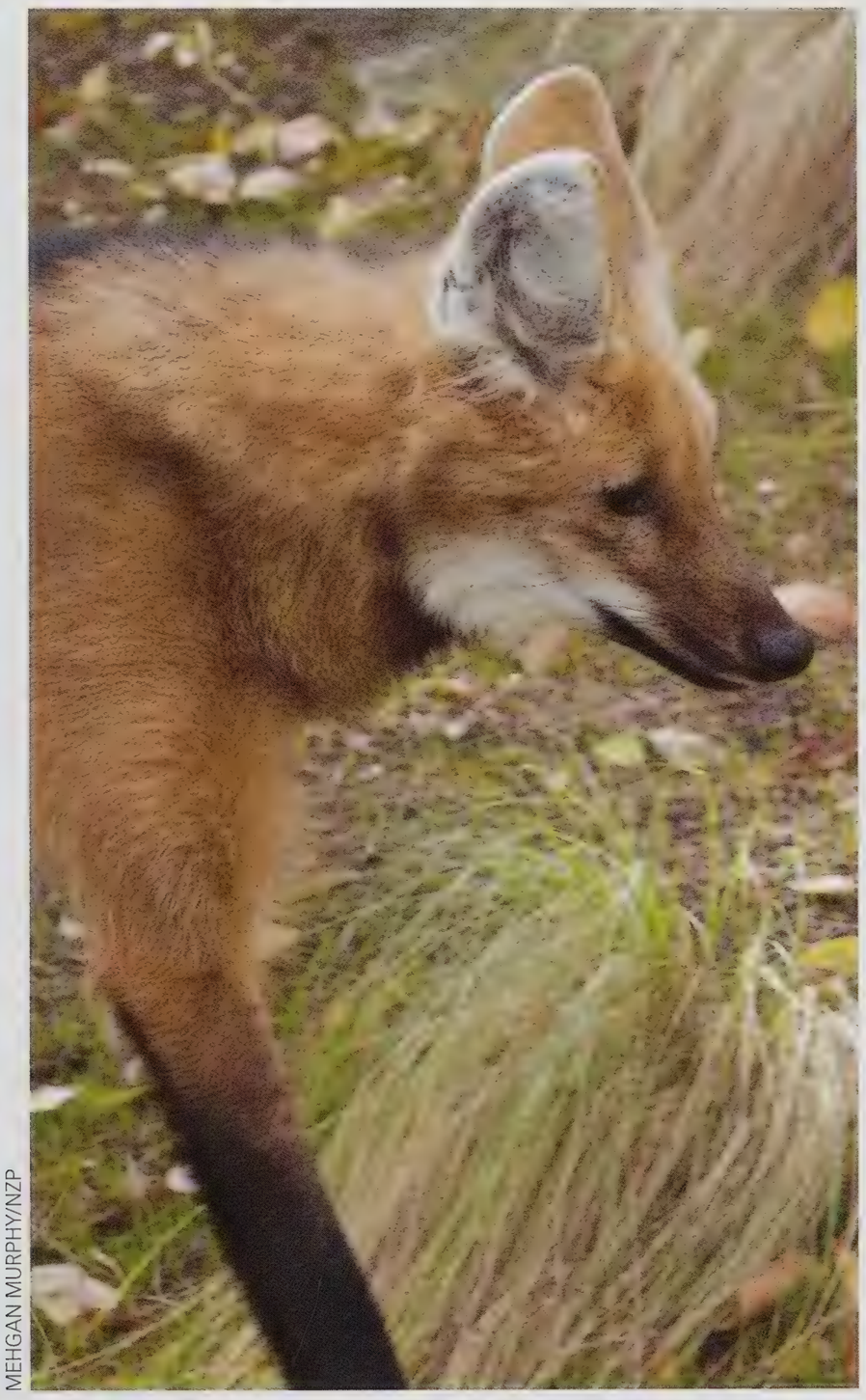
Forest Corridors Essential for Conservation

Scientists at the Smithsonian Conservation Biology Institute used genetic analysis in two separate studies to confirm that natural forest corridors in India are essential to the long-term survival of tigers and leopards. These corridors allow pathways for populations of tigers and leopards to mingle, ensuring genetic diversity and gene flow. The results of these studies were published in *Ecology and Evolution* and *Diversity and Distributions*.

Habitat fragmentation can divide populations of species into isolated groups, which can lead to inbreeding and a genetic bottleneck that affects the long-term viability of the population. By analyzing the genetic diversity between separate but corridor-connected populations of tigers and leopards in India, researchers showed that the big cats were routinely using undeveloped corridors of forest to breed with individuals in different populations.

"This research provides crucial information about the need to maintain these vital veins to support tiger and leopard populations," said Sandeep Sharma, SCBI visiting scholar and lead author of the *Ecology and Evolution* paper.

In addition to Sharma, the papers' other SCBI authors are Trishna Dutta, SCBI visiting student, Jesús Maldonado, research geneticist at SCBI's Center for Conservation and Evolutionary Genetics, and John Seidensticker, head of SCBI's Conservation Ecology Center.



MEHGAN MURPHY/NZP

Farewell to a Maned Wolf

The Zoo is mourning the loss of Diamantina, a 16-year-old female maned wolf who died March 8. Wild maned wolves generally live about 13 years, while 16 years is a more typical lifespan for zoo wolves.

Diamantina arrived at the Zoo in October 2009 to be a non-breeding companion for Siete, the Zoo's 10-year-old maned wolf. The two wolves lived together at the Cheetah Conservation Station, and offered Zoo visitors, keepers, and scientists the opportunity to observe maned wolf social behaviors and interactions.

Zoo visitors can see Siete on exhibit at the Cheetah Conservation Station.

Mark Your Calendar

June 8 **World Ocean Day**
Visit the Invertebrate House for a fun family-friendly event offering educational activities for children, keeper talks, and aquatic animal demonstrations.

June 29 **Bear Awareness Day**
Become more Bear Aware at our free family-friendly event celebrating bears of all kinds. This event offers educational and fun activities for children, keeper talks, and animal demonstrations.

July 11 **Brew at the Zoo**
Raise your glass to conservation and sample beer from more than 60 microbreweries at our annual Brew at the Zoo. **Learn more at fonz.org/brew.**

JENNIFER ZOON/NZP

ELLIOTT FABRIZIO/NZP

Apps for Apes

What do you give an ape who has everything? An iPad, of course.

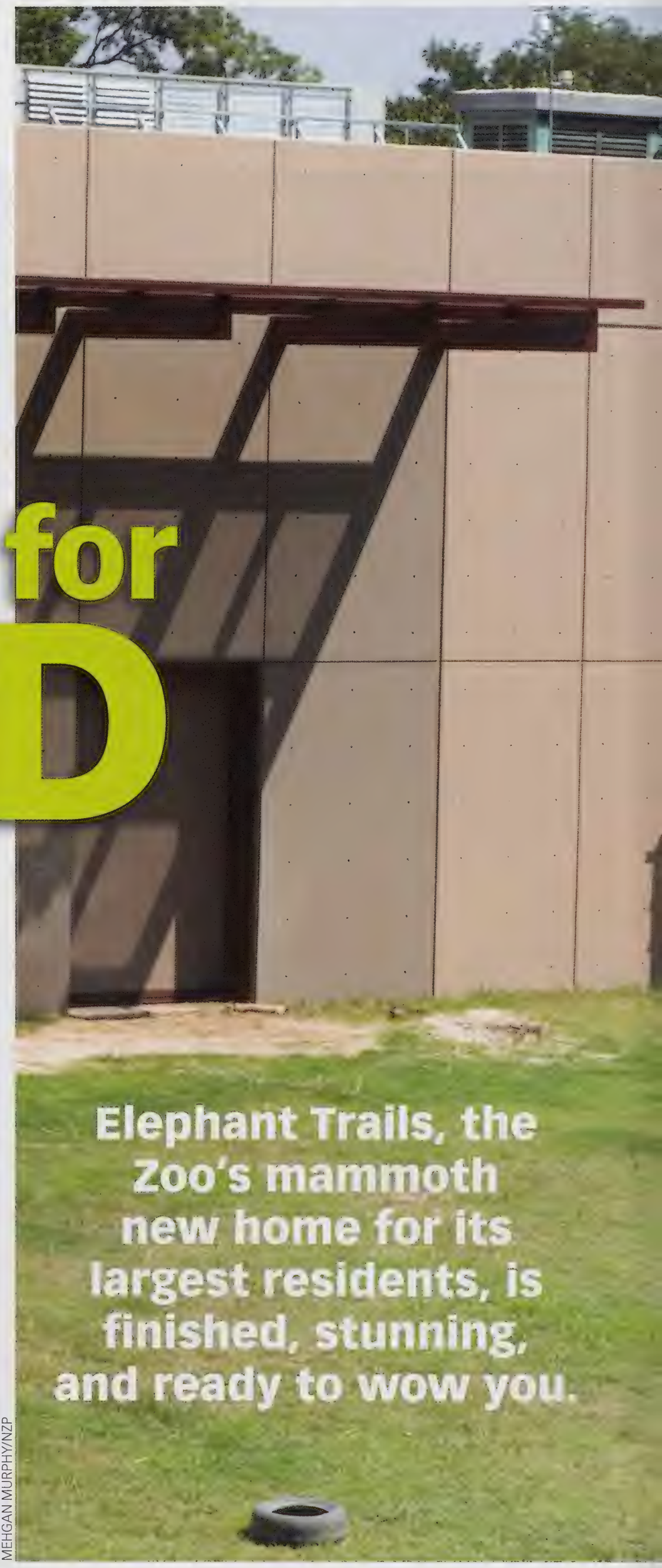
With the tap of a finger, keepers are introducing the Zoo's six orangutans to iPads, which provide unique stimuli and opportunities for interaction. The high-tech enrichment program—Apps for Apes—was developed by Orangutan Outreach, and has seen great success in 12 other zoos around the world.

At the Zoo, keepers have discovered that 36-year-old Bonnie likes to bang on the drums, 16-year-old Kyle prefers the piano, and 25-year-old Iris is content to listen to the soothing sounds of the koi pond while watching animated fish splash.

Fans who want to provide the Zoo's apes with additional apps can purchase an iTunes gift card through the Giving Tree on the Zoo's website. Orangutan Outreach also accepts iPad donations for distribution to zoos around the country.

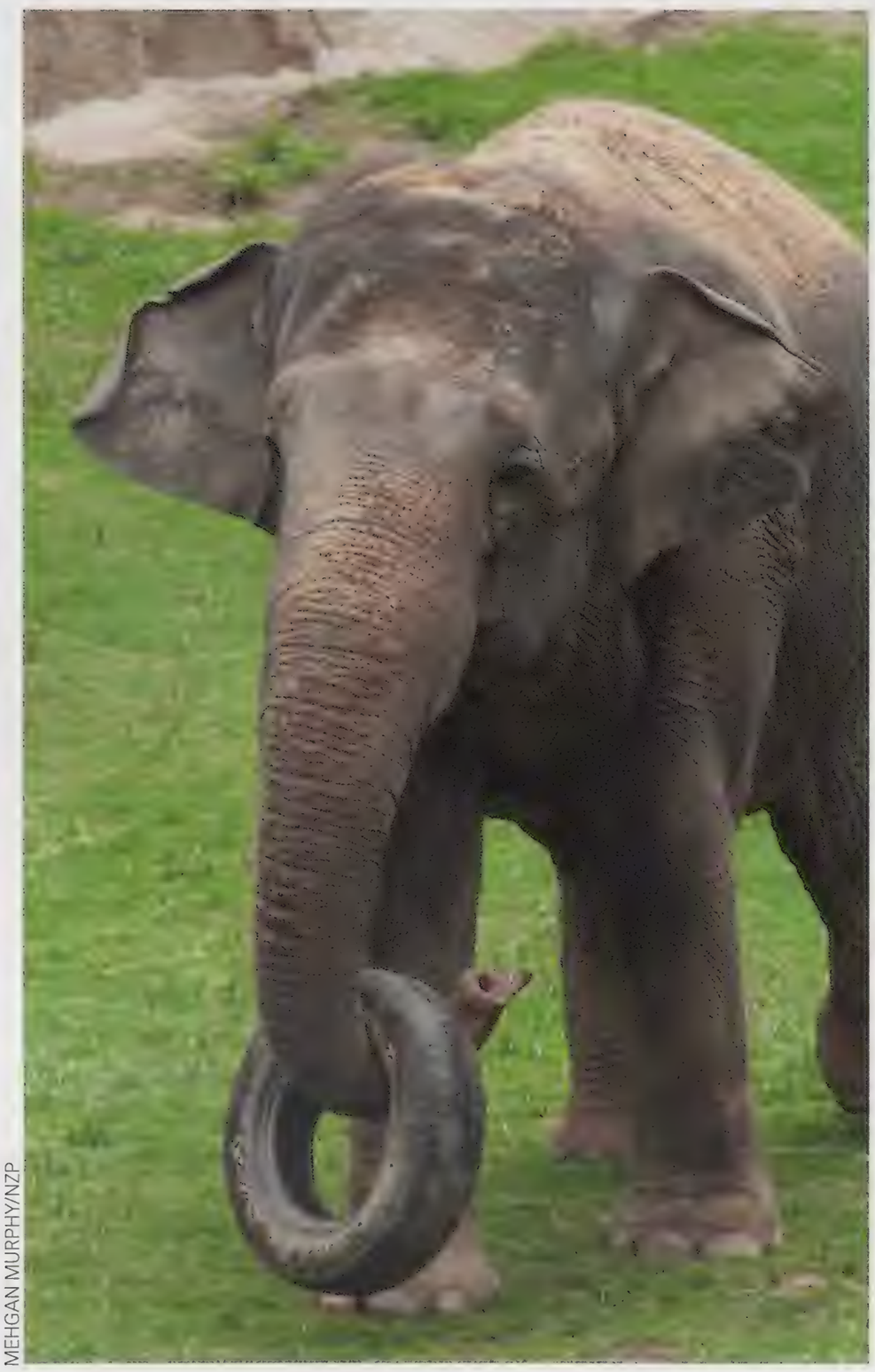
a HOME for the HERD

BY ANNE GODDARD



Elephant Trails, the Zoo's mammoth new home for its largest residents, is finished, stunning, and ready to wow you.

MEHGAN MURPHY/NZP



MEHGAN MURPHY/NZP

It all started with stories. When the Smithsonian's National Zoo decided, half a decade ago, to reinvent its elephant habitat, exhibit developer Aaron Smith began by listening. "I met with Zoo scientists, elephant keepers, educators, volunteers, and others to figure out the stories we needed to tell people about Asian elephants," says Smith.

This "extreme collaboration," as Smith calls it, could be tough. "Finding time when globe-trotting researchers and other busy Zoo professionals could pause and think about a new exhibit was difficult but always rewarding," he recalls.

Susan Ades agrees. As the Zoo's director of exhibits, she picked up the project after Smith left for a position in California. "Our team really came together so well to design this exhibit," she says.

"We had three scientists representing different disciplines, several animal care staff, exhibit designers, and veterinarians all come together to develop our content. It's very satisfying for such a great team to come together and create a very dynamic visitor experience that will give guests the opportunity to learn about the Zoo's elephant care and conservation programs."

Living Social

Out of extreme collaboration emerged a bold vision called Elephant Trails. It was a plan for a huge, innovative, eco-friendly habitat for the Zoo's largest inhabitants. The gray giants' new home would afford them opportunities to forage, exercise, play, socialize, and generally live as naturally as possible.

For elephants, living naturally means living together (with some exceptions). Elephant Trails was created with that in mind. "One of the driving themes in our design efforts," says curator Tony Barthel, "was that we really worked hard to

design the facility around the elephant herd instead of simply designing around a certain number of individual elephants. This concept of building around a social unit guided virtually every decision we made." The new space can accommodate a multigenerational herd with up to ten members.

Few aspects of the project illustrate the evolution of the Zoo's elephant husbandry more vividly than the transformation of the historic elephant house, built in the 1930s. It reopened March 23 as the Elephant Community Center (ECC), a key jewel in the Elephant Trails crown. "The original house was built to showcase individual elephants," explains Barthel. "The new community center is designed around an entire herd. It gives us the versatility and space we need to grow our elephant family."

With 19,000 square feet of space, the new ECC offers elephants plenty of room to gather indoors, especially on cold or rainy days. There are spaces to eat, sleep, or just hang out. A sand floor, wading pools, and scattered, moveable tree trunks and toys provide opportunities to unwind comfortably. Windows and skylights bathe the vast interior in natural light, and huge barn-style doors allow fresh air to flow through the space.

The ECC doesn't just benefit its enormous inhabitants. It also provides opportunities for scientists to probe the mysteries of Asian elephants' social structure and behavior. This is huge, since even experts know relatively little about how these beloved behemoths live in groups. Potential research topics include interactions among females, mother-child relationships, bull behavior, mate choice, and more. The Zoo's elephants will also continue to help scientists study cognition.

Barthel explains, "The facility itself will foster research opportunities through some of the infrastructure we've included, such as cameras and other recording devices to help us collect data on the elephants' behavior at all times." This, he notes, will continue a promising pattern that began with the opening, in 2010, of the first phase of Elephant Trails.

"A visit to the new habitat helped spearhead a growing relationship with the Malaysian Department of Wildlife and National Parks. This relationship has involved staff traveling back and forth, training opportunities in a number of areas, and partnerships with a variety of conservation projects in Malaysia."

MEHGAN MURPHY/NZP

MEHGAN MURPHY/NZP

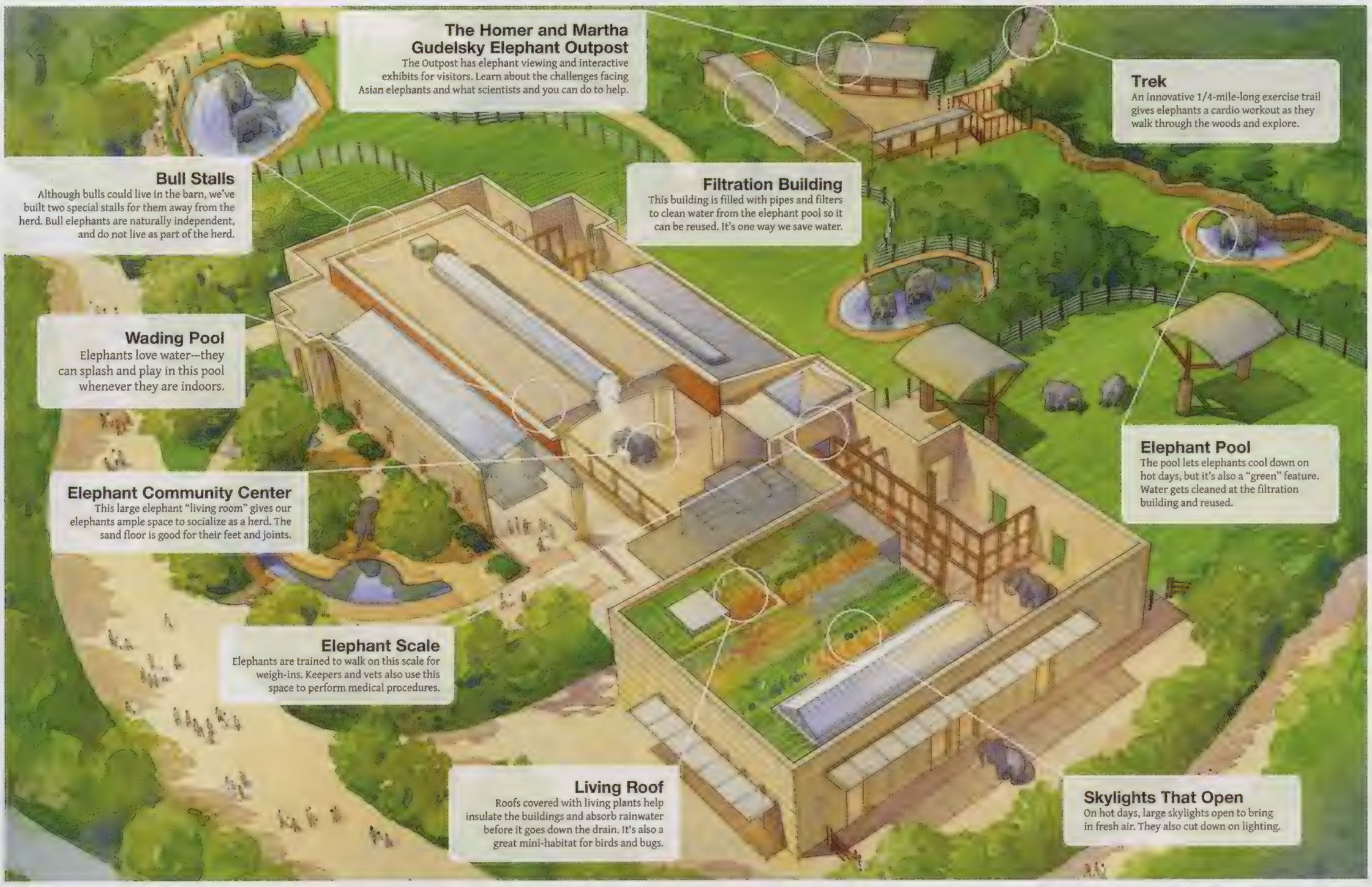
Elephant Trails and the Elephant Community Center were designed and built with an elephant herd in mind. The new space is large enough to house up to ten elephants.

Adding Value for Visitors

The opening of the ECC will enrich visitors' elephant encounters in a variety of ways. "The most exciting thing." says Ades, "is the size of the Elephant Community Center. Visitors will be able to see a multigenerational herd interacting naturally."

That's not all. The ECC also includes exhibits that tell some of the Zoo's myriad stories about its popular pachyderms. "As it turned out," Smith recalls, "there were an astonishing number of fascinating, heartwarming stories and volumes of information to share—far more than we could ever fit into one exhibit. It was my job to work with the Elephant Trails team and make good choices about what to present to the public and invent creative ways to get people engaged."

The team settled on several hefty stories to tell. "We have one exhibit focusing on the National Zoo's long history with elephant conservation," says Ades. "It is an interactive time line that starts with the story of the Zoo's first elephant, in 1890, and includes each important



milestone of elephant conservation along the way."

Another exhibit, called Extreme Elephants, drives home the sheer bulk of these endangered animals. Life-size cutouts of an adult and a calf allow visitors to see how they measure up against the animals. A supersize scale gives guests the chance to compare human and elephantine weights. Should those experiences fail to sway a visitor, there's also the opportunity to attempt to push 1,600 pounds—something an elephant does easily.

The Extreme Elephants exhibit also explores what it takes to fuel an Asian elephant. Giant acrylic tubes hold replicas of a day's rations, both food and water. Another pair of tubes shows the resulting output of urine and excrement.

The Epic Elephant Stories exhibit showcases scientific research. Videos depict herd behavior and social life; they also provide glimpses into three studies, which included our young male, Kandula, on elephant intelligence.

The exhibit also introduces visitors to one of the most important tools for elephant research—the spectrograph. This instrument measures sound levels. That's a huge help to scientists, since elephant vocalizations—a key part of herd life—are often too low in pitch for humans to hear.

"We did this exhibit in conjunction with the Cornell Lab of Ornithology," says Ades. "They have a fantastic library of digital recordings of thousands of different species. Visitors can choose one of three elephant sounds: a roar, a rumble, or a trumpet. They can then play the sound as the spectrograph maps out visually the pitch and loudness of the vocalization. There's also a microphone, which visitors can use to emulate elephant sounds."

These hands-on exhibits, Ades says, "create a very dynamic visitor experience. We wanted to bring interactivity into the ECC. The old elephant house had just graphics and not many of them. This is really an opportunity to bring our content to life."

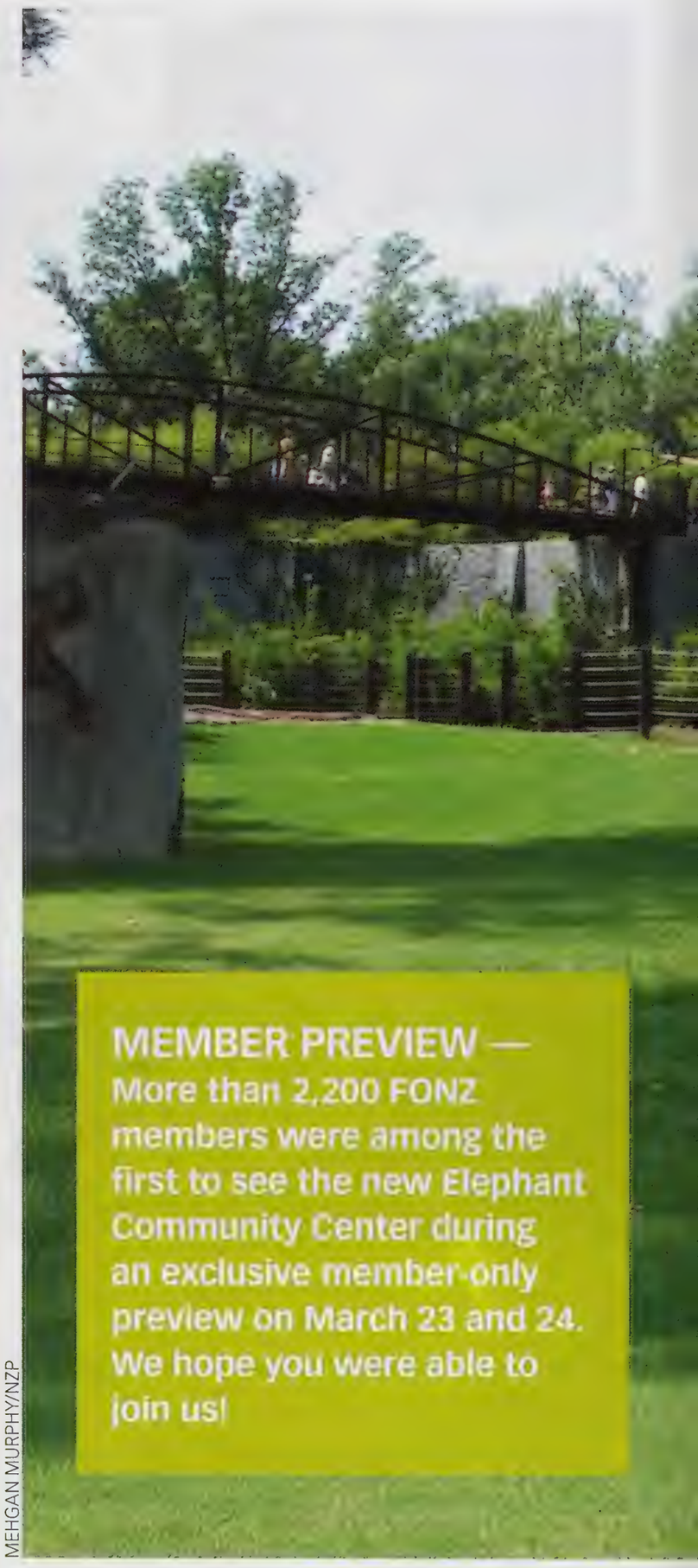
Supersize Science

Bringing content to life is also the mission of another key Elephant Trails feature—the Homer and Martha Gudelsky Elephant Outpost. The outpost, which opened in 2010, includes both hands-on exhibits and fascinating wall displays.

"We let visitors experience what it means to be an elephant researcher," says Smith. "These exhibits were inspired by the work of hormone expert Janine Brown and elephant researcher Peter Leimgruber. Both are part of the Smithsonian Conservation Biology Institute. We wanted visitors to come away with an understanding that science is an incredible adventure."

The Elephant Labyrinth game pits visitors against the threats faced by Asian elephants in the wild. Players try to maneuver an elephant (portrayed by a steel ball) from one forest patch to another without falling prey to poachers, cars, or trains. Players must also avoid coming too close to a village or palm oil plantation, since doing so can spark human-animal conflict.

MEHGAN MURPHY/NZP



MEMBER PREVIEW — More than 2,200 FONZ members were among the first to see the new Elephant Community Center during an exclusive member-only preview on March 23 and 24. We hope you were able to join us!

MEHGAN MURPHY/NZP

MEHGAN MURPHY/NZP

Green Giants

"In Elephant Trails," says exhibit developer Aaron Smith, "we chose to focus on the positive and exciting conservation work that is being done to help save Asian elephants. Zoo scientists and their colleagues in Asia are trying hard to improve the odds for these amazing animals."

Elephant Trails does more than simply tell a conservation story, however. It also furthers the cause of conservation through its Earth-friendly architecture. The Elephant Community Center (housed in the old elephant house) and the new elephant barn that adjoins it meet the stringent standards for Gold certification in the LEED (Leadership in Energy and Environmental Design) program of the U.S. Green Building Council.

Green features include geothermal wells for heating, skylights that reduce the need for electric lighting, recyclable stall materials, and a green roof. Literally green, the roof hosts a layer of plants that collect rainwater and provide insulation. "The geothermal wells that heat the Elephant Community Center are an innovative and green technology not often used in zoos," notes Smith.

Elephant Trails also challenges visitors to go green themselves. In the Elephant Community Center, explains Susan Ades, the Zoo's director of exhibits, "There is a photo booth where visitors can get their pictures taken and take a conservation pledge. Each photo strip has text exhorting visitors to reduce palm oil use, recycle wood and paper, and promote elephant conservation. It is a take-home reminder of the pledge visitors have made to save an endangered species."

Another exhibit focuses on the science of poop, teaching visitors about the many things scientists can learn about elephants' DNA, hormones, diet, and more by examining the animals' droppings. (You can learn more about poop-based science in the "From Poop to Scoop" feature on p. 16.)

A third interactive exhibit teaches visitors about tools and techniques that equip scientists to track elephants in the wild. These include measuring footprints to extrapolate an animal's height, examining bones, and setting camera traps (which take photos when activated by the weight of an animal's foot on a hidden pad.)

Displays provide even more information on elephant tracking. Visitors see examples of scientific tools, including a four-foot-wide radio collar made to fit around an

elephant's neck. Another display explains the differences between African and Asian elephants. The outpost also includes bathrooms and a shop that sells both souvenirs and snacks.

Near the outpost lies the entrance to one of the most distinctive features of Elephant Trails—the Elephant Trek. This feature, unique to the National Zoo, is a path that leads uphill toward the Bird House for about a third of a mile. Trekking it is the equivalent of climbing five flights of stairs.

"The elephants really seem to love traveling on the trek," says Barthel. No doubt it helps that the trees lining the path offer the opportunity to munch on leaves and twigs. The trek, Barthel notes, has also proven "a great outlet for Kandula, our young male, when he has extra energy to release."

Huge Hopes

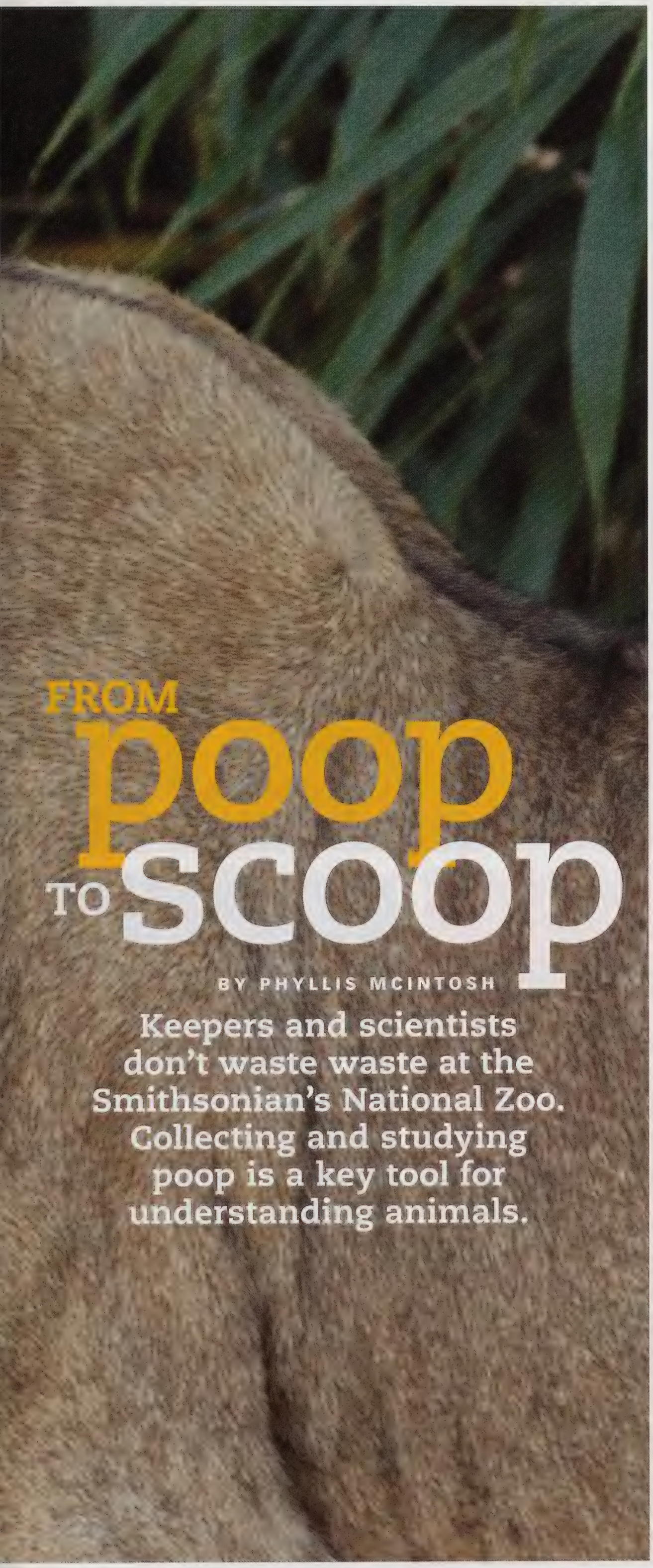
Elephant Trails' enormous inhabitants, vast spaces both indoors and out, and interactive exhibits tell a variety of stories. Visitors come away with brains full of elephant facts, animal care insights, new understandings about conservation biology, a deeper sense of wildlife issues, and a renewed appreciation for the Zoo's multifaceted work with Asian elephants. But that's not enough.

As they wrapped up the last pieces of this mammoth project, members of the exhibit team voiced their hopes that their work will touch not just brains but also hearts. "Our goal is to inspire people to care about Asian elephants on a personal level," says Smith.

"We want to share how much the National Zoo is doing to help save them and invite visitors to get involved. The hard work of the animal care staff and researchers is part of an ongoing commitment to the animals' survival. I think the new habitats, exhibits, and light-filled Elephant Community Center are all testaments to the Zoo's dedication to Asian elephants."

Getting visitors to share that dedication has been a paramount goal for the Elephant Trails team. "I hope visitors take away a profound sense of excitement about Asian elephants," says Smith. "I hope people are inspired to take action toward saving this magnificent species that is rapidly disappearing in the wild." SZ

— ANNE GODDARD *was an intern in the Zoo's office of communications.*



FROM poop TO SCOOP

BY PHYLLIS MCINTOSH

Keepers and scientists don't waste waste at the Smithsonian's National Zoo. Collecting and studying poop is a key tool for understanding animals.

JESSIE COHEN/NZP

All that glitters is not gold.

Sometimes it's poop. Behind the scenes of the Great Cats exhibit at the Smithsonian's National Zoo, two freezers hold a dazzling array of sparkly, colorful poop donated by lions, tigers, caracals, Andean bears, and giant anteaters. The undigested, nontoxic glitter—red, green, gold, purple—helps keepers identify whose poop is whose as they collect it, bag it, and plop it in the freezer.

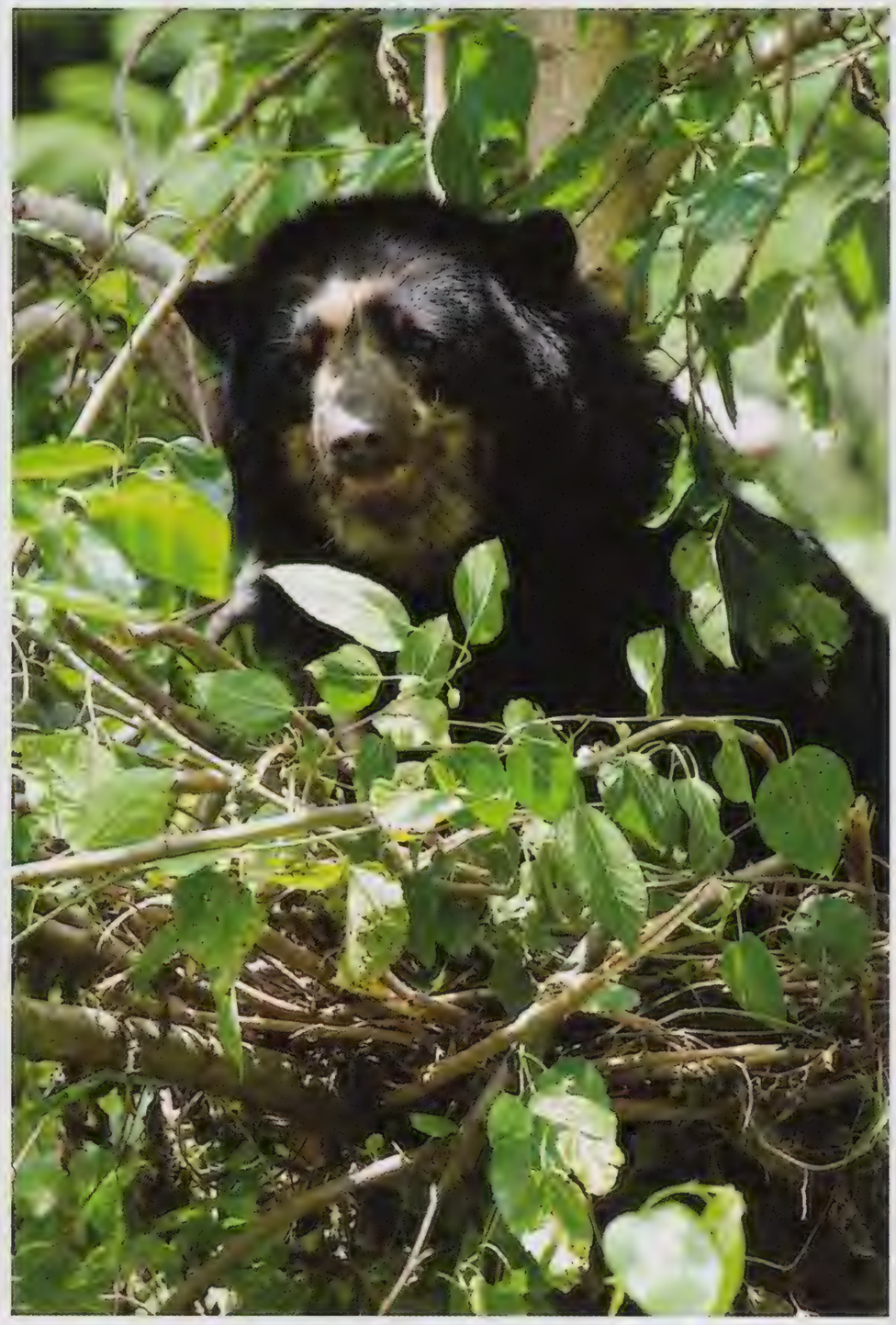
Poop, you see, is a treasure trove of information about an animal's health and reproductive status. To the expert eyes of the Zoo's endocrinologists, hormones distilled from feces reveal the inside scoop on an animal's life, from its stress level to when it will give birth.

Hormones excreted from various body organs can show up in blood, urine, feces, saliva, and sometimes even hair. Poop has the advantage of being easy to collect with no distress to the animal, and it's something keepers have to clean up anyway. Unlike a blood sample, which reveals only what is happening in the body at that moment, poop represents an average of hormone levels throughout an entire day, providing a more accurate reading of stress levels, for example.

The disadvantage is that extracting hormone data from poop is a tedious process that takes at least ten days. When immediate results are needed, as for timing artificial insemination, poop is not the stuff of choice.

Poop has, however, yielded valuable information to guide the breeding and management of more than 50 species, say scientists in the endocrinology laboratory at Smithsonian Conservation Biology Institute (SCBI) headquarters in Front Royal, Virginia. As the only lab providing hormone

MEHGAN MURPHY/NZP



MEHGAN MURPHY/NZP

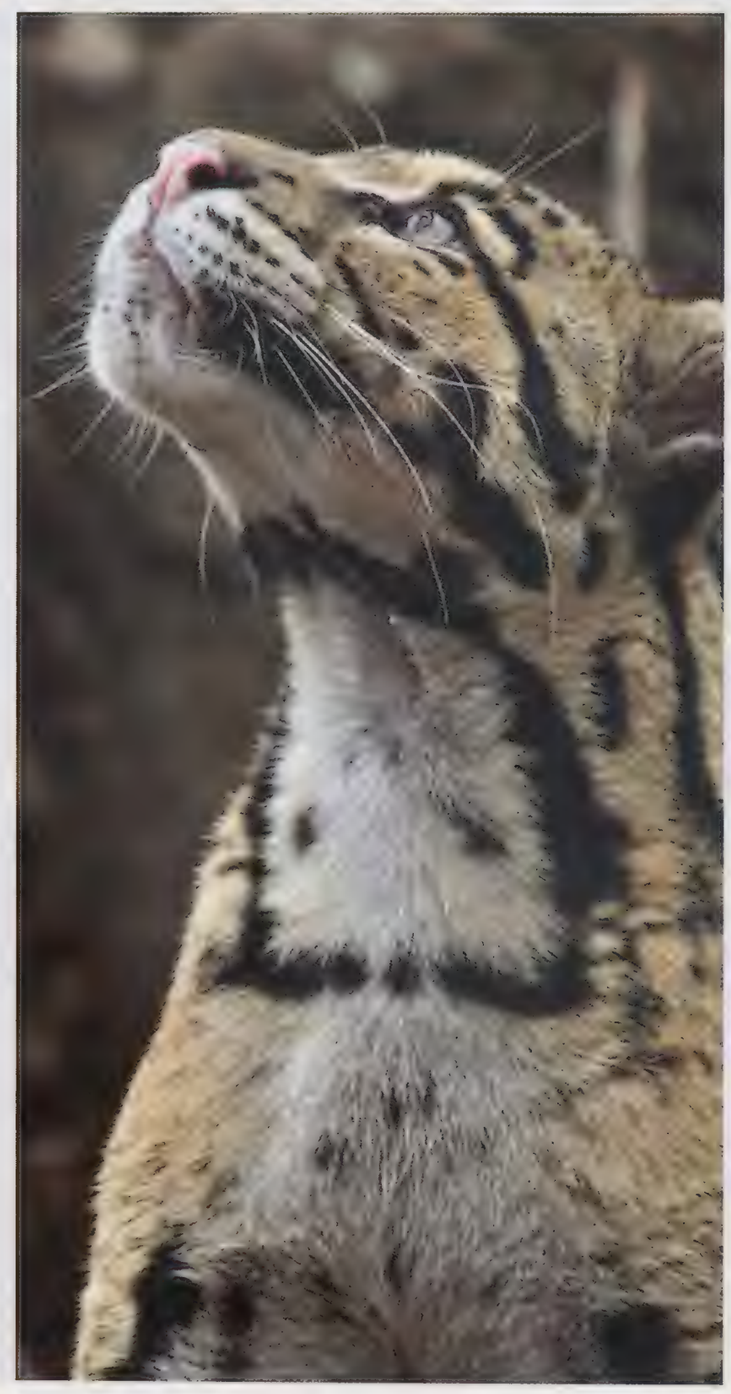
BAKE AND SHAKE

Working with poop in the Zoo's endocrinology lab is not as gross as it sounds. For one thing, it's rarely fresh. It arrives frozen and stays frozen in small baggies. Technicians then pack the bags onto disposable trays and place 20 trays at a time in a freeze dryer where the poop "bakes" for five days.

When it emerges from the dryer, the dried poop is smashed with a rubber mallet until it resembles powdered mud. If necessary, it's sifted through a kitchen sieve to remove bits of hair, grass, or straw. Technicians then carefully measure a specific amount of the crumbled poop into a glass tube and add an alcohol-and-water solution.

Some samples then go into a machine that shakes them for 30 minutes. Others land in a boiling water bath for 20 minutes. Each winds up in a centrifuge. By the end of that process, the hormones have moved into the solution, which, after some further reconstituting, is ready to analyze. "That one process extracts all the hormones," technician Sarah Putman explains. "We don't have to do one for testosterone, one for estrogen, one for stress hormone. They're all there."

Of course, poop is still poop, so there's always some odor. The hands-down winner for smelliest poop, lab staff say, is the cheetah's. No one knows why it's worse than, say, a lion's, since both cats consume the same diet. Least objectionable to staff noses is the bamboo-laden poop of the giant panda, which some think smells like tea.



MEHGAN MURPHY/NZP

analysis for zoos across the country, its work is much in demand. A zoo may simply want to know if its gorilla is pregnant or if a new exhibit design is causing its cats stress, says reproductive physiologist Janine Brown, who heads the lab. Other zoos regularly send samples for long-term monitoring. Deliveries of frozen poop arrive weekly via FedEx and UPS.

Poop and Pregnancy

Not surprisingly, the majority of investigations focus on reproduction. Hormones isolated from poop reveal whether an animal has reached reproductive age or if a female is in season, pregnant, or about to give birth. Such data are particularly valuable for experts in charge of Species Survival Plans (SSPs). The ocelot SSP team, for example, wants analysis of poop for two or three months to make sure cats have normal cycles before recommending them for breeding.

Brown and her colleagues also have done extensive research for the elephant SSP since 1995. Currently, they are studying hormones in poop to determine if something in the zoo environment or herd social structure may be disrupting ovarian cycles in elephants and contributing to early puberty—sometimes as young as age four—in some female Asian elephants.

Wild populations also come under scrutiny. Yearly analysis of poop from Arctic musk oxen helps scientists track pregnancy rates, a good measure of the herd's reproductive fitness.

At the National Zoo, fecal analysis has tracked reproductive function in everything from kiwis to maned wolves to critically endangered dama gazelles. Pregnancy tests often confirm what keepers already suspect from physical and behavioral signs. But it is not uncommon for animals to have false pregnancies that can even promote milk development. Poop can often tell definitively whether babies are on the way.

Monitoring poop also helps keepers better understand animals, such as the giant anteater, whose reproductive clues are subtle. The Zoo has been successful in breeding anteaters, but because keepers couldn't tell for sure when the female was cycling, they didn't know which of numerous matings had produced a pregnancy. "There were two or three months when we were thinking we could have a baby," says curator Craig Saffoe. An endocrine profile, matched with keepers' observations, pinpointed the date of conception and shed light on a species for which the scientific literature is scarce.

One of the most ambitious poop projects at SCBI's endocrinology lab is a groundbreaking study of puberty in young lions. Lab technician Sarah Putman, jokingly called the poop queen of SCBI, has analyzed more than 6,000 samples from 43 lions in 20 zoos, including the seven cubs born at the National Zoo in 2010.

Behaviorally, young lions can be a bit of a puzzle. They may not seem sexually interested in each other at all. Both sexes engage in mounting behavior, so it can be hard to distinguish between cubs' natural exploratory activities and actual mating efforts. Knowing for sure when females begin to cycle and males start to produce sperm could be extremely valuable in preventing "Oops!" pregnancies. "We may think we know what a behavior means, but we're still interpreting," says Saffoe. "The endocrine information doesn't lie. It tells us in black and white what is happening with an animal."

Improving Animals' Lives

Poop studies have improved animal management in a number of other ways. Back in the 1990s, Ken Lang, a long-time clouded leopard keeper at SCBI, wondered if the relatively new science of hormone analysis could explain why some of the cats seemed particularly agitated and high-strung. After analyzing poop from virtually all zoos in the country that housed clouded leopards, endocrinologists concluded that animals with access to the greatest heights were the least stressed.

That's understandable, given that clouded leopards are tree dwellers in the wild. The findings led the clouded leopard SSP team to recommend that zoo enclosures be at least eight feet high. Ten to twelve feet, the experts suggested, would be optimal.

At the Zoo, sometimes the animals' poop glitters. When keepers need to be sure they are collecting samples from a specific animal, they may add nontoxic glitter to the animal's food. The glitter passes safely through the animal's system, making it easy for keepers to find and collect the correct poop sample.

MEHGAN MURPHY/NZP

Poop monitoring also helped keep peace among six male Asian small-clawed otters on Asia Trail. To control aggression among the boys, Zoo veterinarians gave them a drug to lower testosterone. Regular measuring of the hormone in the otters' poop told vets when it was time for a booster.

The Challenge of Scooping Poop

Gathering poop for such studies is not as easy as it might seem, especially when multiple animals share the same enclosure. Keepers experiment with indigestible items in their charges' food. These can include nontoxic glitter or dyes, as well as uncooked rice, beans, or lentils.

That sounds simple, but additives can be tricky. Blue turns to green, green turns to blue, and gold and silver look the same after a trip through the digestive tract. Rice or lentils may be embedded in the poop, requiring some unpleasant squishing to find them. And if one animal doesn't finish its meal, another may eat the rest, confusing poop results.

Glitter and other additives don't work with animals, such as dama gazelles, that eat hay and pellets, and are fed as a herd. "We either have to separate them and wait them out or stand there and watch them all and hope they go in a reasonable amount of time," says keeper Gil Myers.

Scouting out poop in the wild presents its own challenges. Tracking elephants in southern Africa, Zoo researchers camped out in trucks at watering holes. They watched who pooped where, swooping in to collect samples as soon as the animals left. When studying a population rather than individual animals, researchers train local people to identify the species' poop, determine if it's fresh (after two days, hormones start to degrade), and collect as many samples as they find in a certain area. The newest approach, training dogs to identify the poop of selected species, has greatly improved collection in the wild.

To the expert eyes of the Zoo's endocrinologists, hormones distilled from feces reveal the inside scoop on an animal's life, from its stress level to when it will give birth.

Zoo scientists are also experimenting with how to process poop in the field to preserve the hormones. "The toaster oven is pretty popular because it's small, easy to pack, and doesn't require a huge generator," says Putman. "But it can't handle very many samples, and it stinks to high heaven!"

Beyond Poop and Back

Special circumstances sometimes force scientists to think beyond poop. Back when the Zoo had Indian rhinos, keepers were anxious to find out when the female was in peak estrus so she could safely be put in with the male. Fecal or urine analyses didn't work because rhinos tend to urinate and defecate in the same place, thus cross-contaminating both samples. So the female rhino was trained to allow a keeper to scrape a small measuring spoon across her lip to obtain saliva, which proved to be just as useful a source of hormones.

Hair has yielded long-term information about stress in Asiatic black bears rescued from Chinese farms where they were milked for their bile, an ingredient in traditional medicines. Tips of hairs revealed stress levels when they were on the farms and inaccessible to scientists; newer hair close to the body provided more recent readings.

Still, poop remains a key tool for scientists. Because hormones remain stable for a long time in frozen poop, keepers and scientists are stockpiling samples for possible future studies. The endocrinology lab has 43 freezers chock-full of freeze-dried poop and samples awaiting processing.

The ultimate goal is to acquire baseline information on as many species as possible. "If a zoo wants to collect samples from an animal that has a problem, I tell them to collect at the same time from animals that are healthy," says Brown. "We need to know what's normal before we can recognize what's not normal."

With so much to learn from poop, animal care staff try never to miss an opportunity to gather new samples. "With any animal I think there's a reasonable chance we'll want to research, we collect fecals and store them," says Saffoe. "I always have my bags with me." SZ

— *Longtime contributor* PHYLLIS MCINTOSH *is a Zoo volunteer.*

A Dog of a Job

It's challenging enough to find poop on land. Imagine trying to locate it at sea. Samuel Wasser, director of the Center for Conservation Biology at the University of Washington, has trained five dogs to do just that.

Wasser's chief canine helper, a former stray named Tucker, can detect the scent of orca poop well over a nautical mile away even in a raging current. Tucker (or one of his teammates) stands in the bow of the boat. As the vessel closes in on the scent, the dog leans far over the front or to either side to point to the poop's location. Tucker's reward for his work is a chance to indulge his main obsession, playing with an orange ball.

With the dogs' help, Wasser completed a study of right whales in the Bay of Fundy and is now tracking orcas off the coast of Washington State. Formerly with the Zoo's endocrinology lab, he pioneered fecal-hormone analysis and was the first to apply it to animals in the wild. From orca poop, Wasser isolates DNA; stress, reproductive, and thyroid hormones; and toxins. "Using these measures collectively, we get a handle on various pressures, such as the presence of whale-watching boats, lack of food, or toxins in the system, that are affecting the whales," he says.

Bear Cub BONANZA

BY ISAAC JACKSON

The waning weeks of 2012 brought a trio of bear cubs to the Smithsonian's National Zoo. Billie Jean, an Andean bear, gave birth to twins on December 14. Hana, a sloth bear, bore a single cub on December 19.

Each birth was cause for joy. Both Andean bears and sloth bears are vulnerable to extinction in the wild, so any increase in their numbers is encouraging. Breeding bears in human care is difficult, moreover, making each success a true triumph.

Andean bears are the only ursids native to South America. They're also known as spectacled bears due to the white rings around their eyes. Sloth bears, noted for their shaggy coats and white chest markings, live mainly in India, Nepal, and Sri Lanka. The Zoo participates in the Association of Zoos and Aquariums' Species Survival Plans (SSPs) for both species.

DID YOU KNOW

Some **15,000** black bears live in the state of Virginia alone. In contrast, there are only **10,000 to 15,000** sloth bears in the entire world.

What Comes Naturally

A key challenge for breeding bears in human care is finding compatible partners among a relatively small population. Fortunately, the Zoo's Andean and sloth bears have been willing to do what comes naturally. "With the Andean bears," says keeper Karen Abbott, "it is a question of watching their behavior, introducing them, and letting nature take its course."

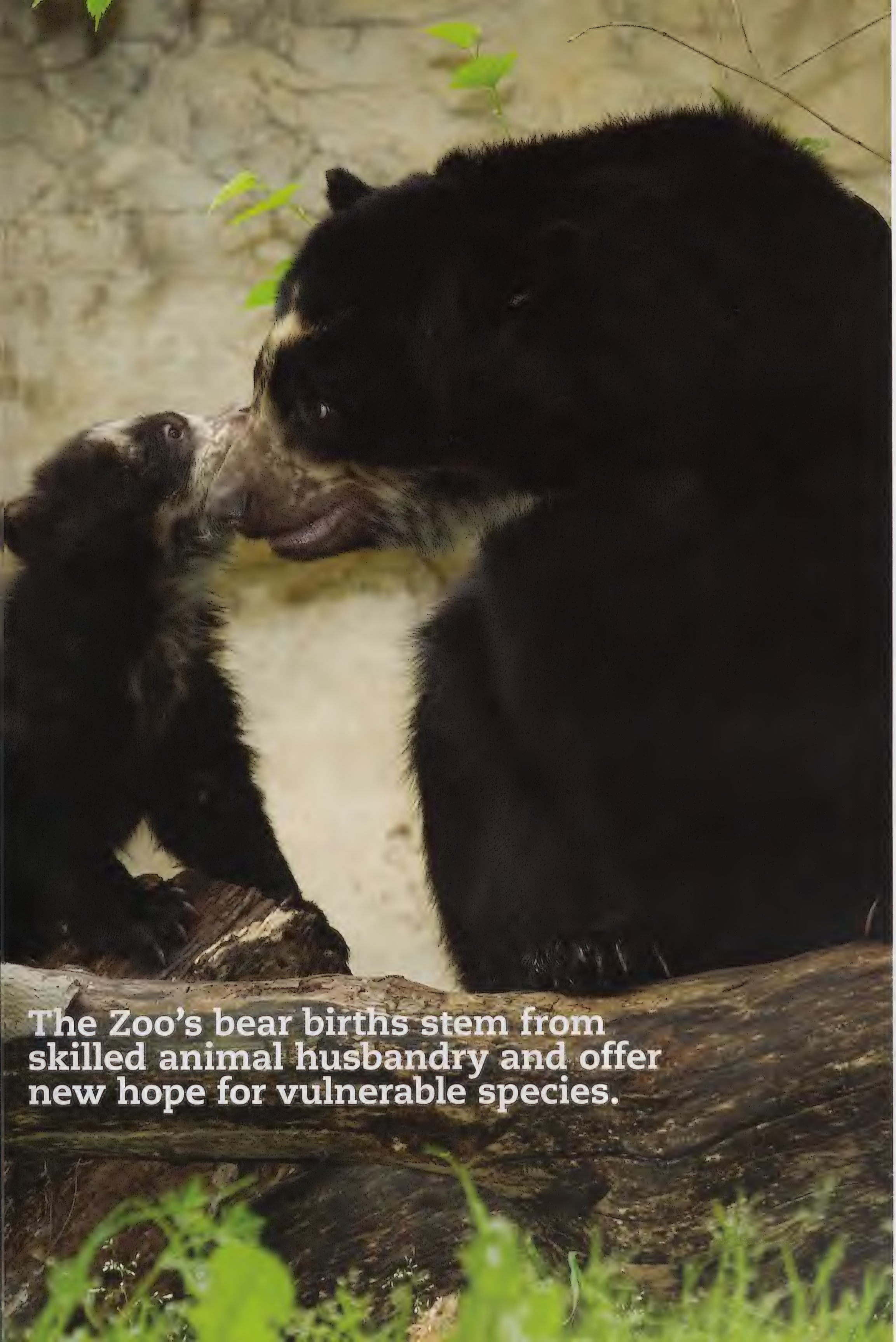
Nature took its course about a year ago. Billie Jean came into heat in March 2012 and again in April. Once breeding was over, she wanted nothing to do with Nikki, the male. That was a striking change from 2010, when Billie Jean continued to play with him and enjoy his company even after mating was done. This new behavior is more typical of adult females.

Despite Billie Jean's normal behavior, cubs initially seemed unlikely. An ultrasound at the end of September proved negative. And since Nikki had died the previous month, that breeding avenue was closed. Yet hope persisted due to a quirk in bears' reproductive lives.

Unlike humans, bears have delayed implementation. Their fertilized eggs can float free for weeks or even months before implanting in the uterine wall. That appears to have happened with Billie Jean. An ultrasound in November 2012 indicated that she was pregnant, and she gave birth about a month later.

Finding the Perfect Moment

Careful observation and timing are also crucial for sloth bear breeding, explains keeper Mindy



The Zoo's bear births stem from skilled animal husbandry and offer new hope for vulnerable species.

MEHGAN MURPHY/NZP

Babitz. She has worked with sloth bears for 12 years and is a leader in conducting introductions, breeding, and birth watches. Babitz keeps a sharp eye out for behavioral changes in Hana, the adult female who recently gave birth.

Hana normally screams at adult males, warning them to keep their distance. That changes only once a year, when she goes into estrus for about a week. Then she shows signs of tolerating male company. Still, Babitz and her Asia Trail colleagues proceed cautiously.

Babitz and her colleagues have good reason for being cautious. Sloth bears' aggressive natures can lead to conflict. Clashes generally take the form of posturing, Babitz explains. "There is a lot of bluffing. They'll stand up tall, bark, brandish their paws, and make a lot of noise, but that's about it." Yet keepers take no chances with animals that could seriously injure each other.

Last fall, for example, Hana appeared open to breeding. So keepers gingerly took steps toward pairing her with Francois, who had been identified by SSP experts as a good genetic match for her. They placed the two bears in adjoining rooms separated by a "mesh-howdy," a sturdy steel screen that allows the animals to see, hear, and smell each other without risk of injury.

Hana screamed. Then she screamed some more. Eventually, though, she grew comfortable with Francois, and the bears mated in November. Hana would not permit animal care staff to perform an ultrasound, which meant that confirmation of her pregnancy came only when she gave birth the next month.

Birth Is Only the Beginning

Wonderful as they were, the bear births posed new challenges for the Zoo's animal care team. Job one, of course, was keeping

MEHGAN MURPHY/NZP

UP A TREE Previous bear cubs at the Zoo proved themselves to be adept climbers right from the start. On their first trip out of the den, Bernardo and Chaska (left), Andean bears born in 2010, ran up a tree. Animal care staff waited for them to come back down, but the cubs stayed put. Finally, a keeper had to climb up to get them.

Sloth bear cubs have their own climbing trick: They grab their mother's fur and clamber up onto her back. Hana was startled when her first cub, born in 2006, did just that. "It was not instinctual for her," keeper Mindy Babitz recalls. "She had the cub on her back and was spinning around, not really sure what was going on." Eventually, Hana got the hang of playing taxi for her cub. Sloth bears are the only ursids that carry their young in that way (below).

JESSIE COHEN/NZP

the cubs alive. Andean bears born in human care have a first year mortality rate of approximately 40 percent. For sloth bears, the mortality rate is closer to 50 percent. (Scientists do not have comparable data for animals born in the wild.)

"The first month is the most critical period," Babitz says. "We were very nervous. Some of the problems we were looking for were Hana to be spending time away from the cub, or the cub emitting weak, prolonged vocalizations."

Both Hana and Billie Jean initially holed up in their dens with the cubs. Determined to give each mom the space and time to feel comfortable and bonded with her young, animal care staff left the animals alone while monitoring them carefully via webcam. The plan worked and the cubs thrived.

"The cubs are fat and noisy," says Abbott about the Andean bears. "That's a good thing. Their vocalizations are good, and when they're nursing, they have a buzzing/humming noise which is the sound of a happy bear."

Only when Billie Jean began carrying her cubs around and out of the den did animal care staff judge it safe to consider a hands-on examination. With the precision of a SWAT team, keepers and veterinary staff lured Billie Jean into a separate room. Once she was secured, the team grabbed the cubs for a quick, but thorough, checkup.

The young bears, everyone was thrilled to find, are in good health. They appear to be a male and a female, but definitively determining a cub's sex is difficult. The team then gave the bears their first vaccinations. By this point, Billie Jean was understandably irked about being separated from her offspring, so the team withdrew and reunited mother and cubs.

Hana's cub is doing well too, Babitz reports: "He's enormous, and every day he looks a little bigger! We can see the white blaze on his chest, and big floppy lips and nose. We have also heard lots of nursing, which is a good sign." Sloth bears also vocalize as they nurse. "The cub sounds like a car engine that won't start, as when you turn the key and the engine continues to turn over," Babitz explains.

MEHGAN MURPHY/NZP

Sloth bears use their lips like a vacuum to suck termites and ants from their nests.

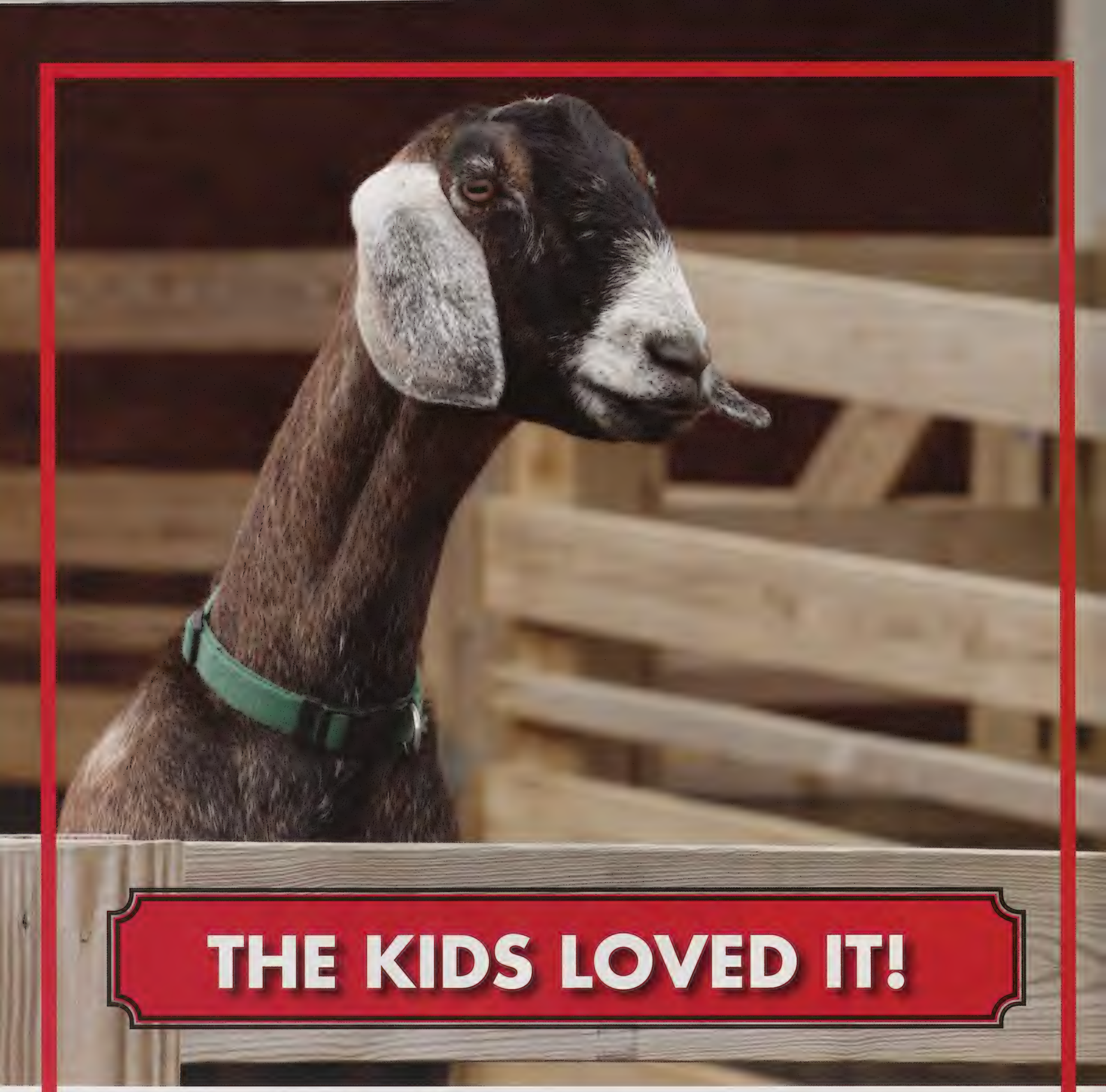
Looking Ahead

All three cubs are cause for celebration. Not only have they survived the critical first months, but they add to a North American zoo population that has recently experienced a lull in bear births. Billie Jean's cubs, for example, are the first successful Andean bear offspring since she last gave birth, in 2010.

Billie Jean's success as a breeder and mother makes animal care staff eager to find her a new mate, given Nikki's death. He will be a tough act to follow. Nikki and Billie Jean were "natural breeders," says Abbott. "They were the absolutely best-case scenario. It went like clockwork, and it was terrific." Zoo staff are working with SSP experts to identify potential partners for Billie Jean.

Babitz and her Asia Trail colleagues, meanwhile, will continue to watch Hana and Francois, reintroducing them if and when the time is right and hoping that history will repeat itself. SZ

— ISAAC JACKSON *was a Smithsonian Zoogoer intern.*



THE KIDS LOVED IT!

APRIL WAS KIDS' FARM MONTH!
Thousands of children enjoyed their visit to the Zoo in April to celebrate Kids' Farm Month. Animal encounters and grooming opportunities, Earth Day activities, keeper talks, story times, and special giveaways were generously presented by State Farm®. Proving once again that learning is fun, especially at the Zoo.

Thank you to State Farm®, FONZ members, and the many supporters who made it possible to keep Kids' Farm open. Look for our fresh new Pizza Playground, sponsored by Ledo Pizza®, coming soon!

KIDS' FARM SPONSORED BY State Farm®

SMITHSONIAN **zoogoer** kids CORNER

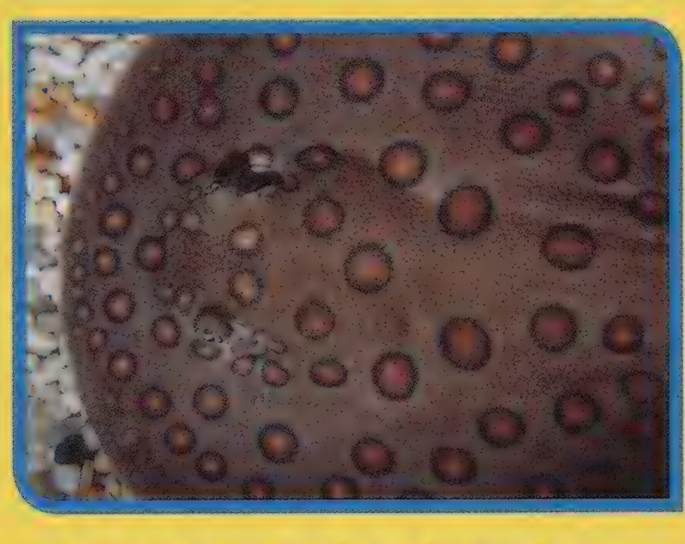
BEAST BITS

Seal OR Sea Lion?

Can you tell a seal apart from a sea lion? Both have strong flippers for swimming, big eyes for seeing and streamlined bodies for diving deep and fast. But, if you look closely, you will see that seals and sea lions do look different. Sea lions have small pointed ears and can stand up on all four flippers. Seals don't have external ears—look for a hole on the side of their head instead. And, although seals have four flippers, they can't stand up. Instead, seals pull themselves along like inchworms. *You can visit the seals and sea lions at the American Trail exhibit.*

MARK VAN BERGH

CONNOR MALLON/NZP



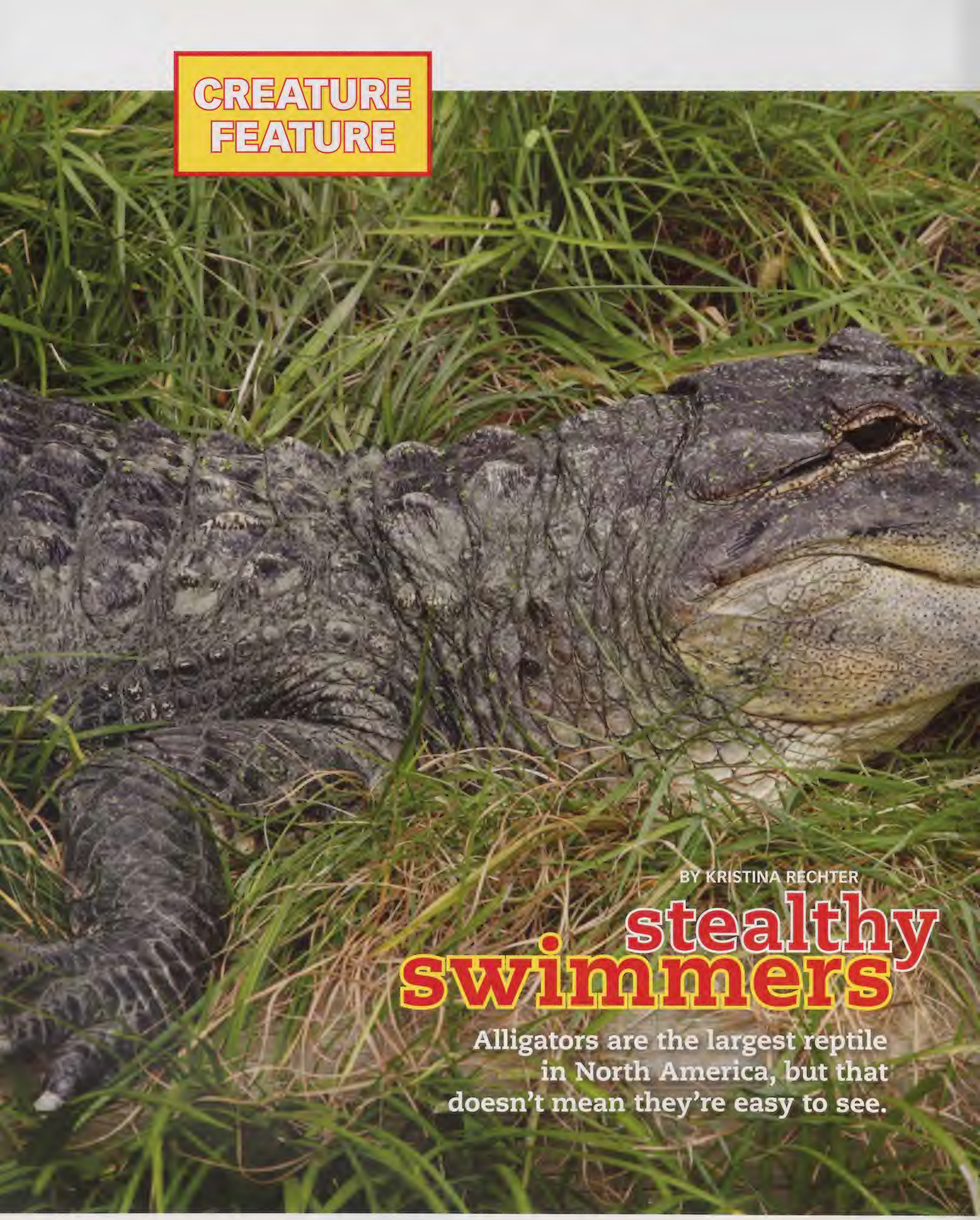
JESSIE COHEN/NZP

Flattened Sharks

They don't look it, but stingrays are actually related to sharks and skates. Stingrays and their relatives don't have bones, but that doesn't mean they're defenseless. If a freshwater stingray feels threatened, it can use a barb on its tail to inject a mild toxin into whatever frightened it. No need to worry however. Stingrays are actually very gentle, and only use their barbed tails when something startles or steps on them. *You can see the freshwater stingrays in the Amazonia Exhibit.*

We wear goggles when we swim, but seals and sea lions use a special third eyelid to protect their eyes when they dive deep in the ocean.

fun fact



CREATURE FEATURE

BY KRISTINA RECHTER

stealthy swimmers

Alligators are the largest reptile in North America, but that doesn't mean they're easy to see.

SMITHSONIAN zoogoer kids CORNER

JESSIE COHEN/NZP

MOTHER Knows Best

Female alligators protect their 35-50 eggs until they hatch, which takes about 65 days. After their babies hatch, mother alligators scoop up the tiny babies with their big mouths and carry them to the water. Mama gator guards her babies for the first few years of their lives. She even protects them from bigger, scarier alligators!

WHAT'S for Dinner?

If an animal comes down to the water's edge to drink, it may become a meal. American alligators aren't choosey. They eat fishes, turtles, mammals, birds, and frogs. Big gators sometimes eat deer, wild hogs, and other alligators.

Lucky LOOKALIKES

Although there are approximately five million American alligators alive today, the species is protected by law because they look so much like several endangered species of crocodiles. This type of protection is called "threatened due to similarity of appearance," and helps protect endangered species from hunters who might confuse them for their non-endangered relatives.

At the ZOO

Come see North America's largest reptile at the Reptile Discovery Center at the Smithsonian's National Zoo.

Sneaky SWAMP DWELLERS

American alligators make their homes in swamps, rivers, lakes, ponds, and marshes in the southeast part of the United States. Even though they can grow to be more than 10 feet long, alligators can be very hard to see because they often swim just below the surface of the water, with only their eyes, nose, and top of their head visible.

GATOR or CROC?

At first glance, alligators and crocodiles look nearly identical. Look for their teeth to tell the difference. When crocodiles close their mouths, you can still see all their teeth, both top and bottom. But, when alligators close their mouths, you can only see their top teeth.

YOUR TURN

Look-alike Relatives?

Alligators look a lot like crocodiles, and seals look a lot like sea lions. But, stingrays don't really look like sharks, even though they are related. Can you think of three reasons why some animals, like stingrays, look different from their relatives? Share your thoughts with us at zoogoer@si.edu.

Valuable Volunteer

ZOO CREW

Brian Cannon is a volunteer keeper aide at the Smithsonian's National Zoo. His days at the Zoo start bright and early, when many of the animals are still sleeping. He prepares food, cleans enclosures, and helps get the animals ready for another day.

DEB GRUPENHOFF/NZP

CONGRATULATIONS TO BRIAN, who was just hired as a full-time keeper at the Zoo!

Before joining the Smithsonian's National Zoo as a volunteer keeper aide, Brian Cannon was a high school teacher. Now, he has gone back to school to study biology and pursue a master's degree in environmental science at George Mason University. "When I started volunteering at the Zoo, I saw an opportunity to transition into something I had always wanted to do," says Brian.

When he's not in school, Brian could be found volunteering as a keeper aide in the Giant Pandas, Asia Trail, Small Mammal, and Cheetah Conservation Station exhibits. "I love watching the animals exhibit their natural behaviors," says Brian. "Working behind the scenes with them is such a unique opportunity."

Early Mornings

The opportunity doesn't come without its sacrifices, though. Brian arrives around 6:30 a.m. most days. He enjoys the peacefulness of the park at this hour. "In the early morning, the Zoo is mostly empty and some of the animals are still asleep. However, the bears and monkeys are usually awake and eager to begin their day."

Brian's early morning routine includes preparing food for the animals, and readying enrichment activities to keep the animals entertained and challenged. There's also a lot of cleaning. "Hosing, scooping, shoveling; animal waste has to be removed every day," says Brian. "And when the weather is bad, the animals still need to be taken care of." Whatever the weather—snow, sleet, wind, or stifling summer heat—the animal care staff must be at the Zoo to ensure the animals are kept safe and well cared for.

Value of Volunteering

If you are interested in someday working at a zoo, Brian suggests looking for volunteer opportunities. "I didn't initially pursue work in this field because I didn't think I could," explains Brian. "Most colleges don't have specialized zookeeper classes."

By volunteering at a zoo, you will learn more about all the jobs and specialties that go into running a zoo, and can better choose classes and school programs that prepare you for the position you would like to have.

Long Hours. Big Rewards.

While the days sometimes begin before the sun rises, and the work can be physically exhausting, Brian says it's never hard to come to work in the morning. "It's so neat to have the opportunity to work with the animals, to watch them engage in their enrichment activities, and to see children experience their first trip to the Zoo. Being a part of that is an awesome experience."

— Ashley Hardaway

The Mani-Feast-O

Special thanks to **LEDO PIZZA** the Pizza Party's biggest supporter!

1) Get Involved
Join the Pizza Party! A group of citizens united by the goal of restoring the Zoo's Pizza Playground where children learn and play.

2) Support the Cause
We need your help to accomplish our goal! Without the support of FONZ members important projects like this would not get completed.

PIZZA PARTY

3) Take Action
Vote! Make a donation today and let your voice be heard! "Save the Pizza!". **Online at fonz.org/pizzaparty.htm**

4) Celebrate
Party at the pizza! We will throw a VIP pizza party event when our mission of saving the pizza has been accomplished.

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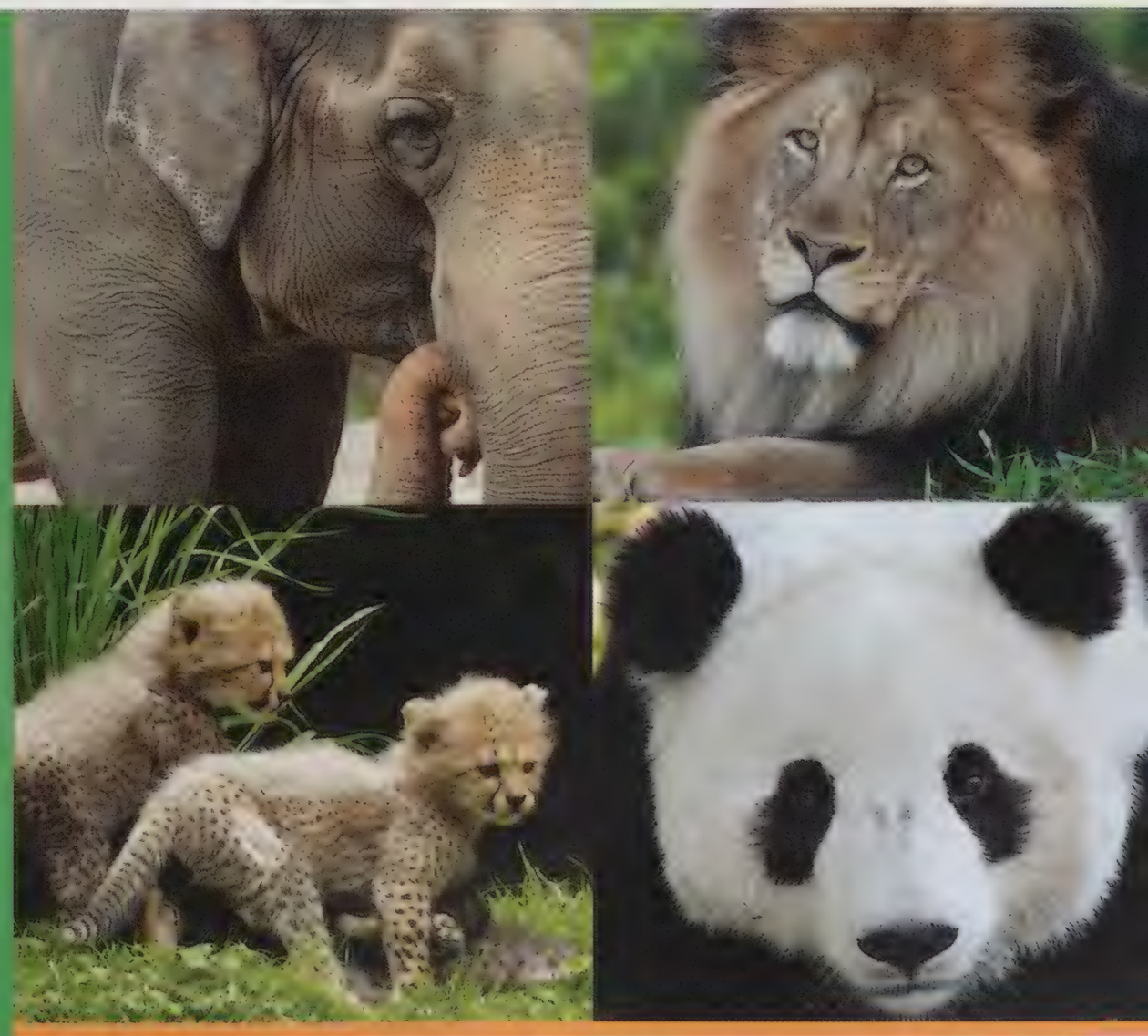

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FONZ RESOURCES

fonz.org

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Comments? Questions?
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member@fonz.org

Not a FONZ member yet?
Call 202.633.3034
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fonz.org/join.htm

FRIENDS OF THE NATIONAL ZOO

SNORE & ROAR

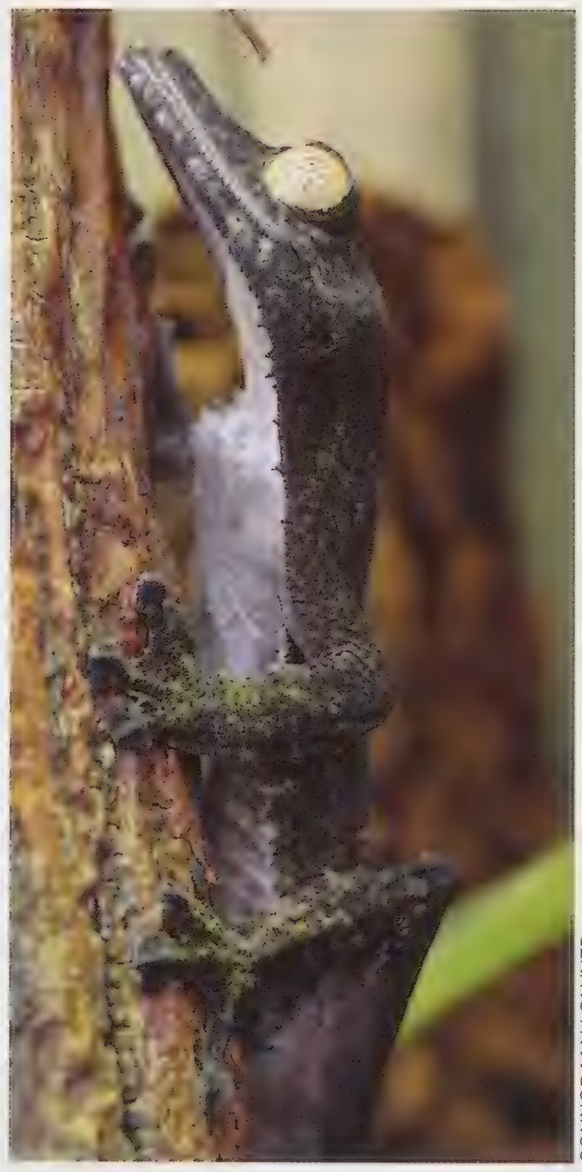
This is no ordinary camping trip!

Imagine waking up to the roar of powerful lions or hearing the early morning call of playful gibbons. Come spend the night at the Smithsonian's National Zoo. It's the best way to see the Zoo's animals after hours and have the park all to yourself.

Your overnight begins with a two-hour, keeper-led tour of an exhibit area. After that, flashlight in hand, take a hike through the Zoo in search of nocturnal animals. Then, fall sound asleep in your tent perched on Lion/Tiger Hill. In the morning, your adventure concludes with a breakfast snack and family-friendly activity.

Snore & Roar overnights take place between June and September. A maximum of six participants may sign up per registration. Large groups cannot be accommodated. Snore & Roar campers sleep in four-person tents. Participants are never asked to share their tent with strangers.

Find a schedule and register at http://nationalzoo.si.edu/ActivitiesAndEvents/Activities/SnoreRoar/



CONNOR MALLON/NZP

MEHGAN MURPHY/NZP

AGES Adults and children ages 6 and up. A paying adult must accompany anyone under 18, and one adult must chaperone every three children. Participants in adult-only overnights must be 21 or older.

TIME 6 p.m. to 9:30 a.m. the following day. A small snack will be provided, however participants should eat dinner before coming to the Zoo. All Zoo restaurants close at 5 p.m.

SNORE & ROARS ARE NOT JUST FOR KIDS! Adult-only programs include wine and cheese, a two-hour, keeper-led tour, flashlight tour of the Zoo, a breakfast snack and engaging activity. **Find a schedule and register for an adult-only Snore & Roar at http://nationalzoo.si.edu/ActivitiesAndEvents/Activities/SnoreRoar/ForAdults.cfm**

CANCELLATION POLICY: Cancellation requests received at least four weeks prior to the scheduled Snore & Roar will receive a 75 percent refund. Requests must be made via email. No refunds or changes will be made thereafter. ***Snore & Roars are a rain or shine event.***

FONZ MEMBERS ONLY
Use discount code SLOTHBEAR2013 at checkout to receive the member rate!

REGISTRATION is now open.

Tour Choices

Enjoy an exclusive, keeper-led tour of one of the following areas.

Amazonia The rainforest comes alive at night with the sounds of our favorite nocturnal creatures. Hear a chorus of calls from frogs and toads, and learn all about the growing importance of amphibian conservation. See a fish feeding frenzy and maybe even catch a glimpse of the meandering two-toed sloth. It's a sensory experience your family won't soon forget!

FEE: $80 per person
DATES: July 20 (Family)

American Trail Join us on an adventure to celebrate the remarkable diversity of American species. Your keeper-led tour will guide you from the waters of the North Pacific with a visit to our playful California sea lions on up the trail past the canine predators of the open tundra through to the renowned architects of freshwater systems, the American beavers.

FEE: $130 per person
DATES: June 28 (Family), July 12 (Family), July 27 (Adult-only), August 9 (Family), August 31 (Family), September 27 (Family)

Asia Trail Wonder where those 11, adorable, Asian small-clawed otters go at night? Join us for an Asia Trail Snore & Roar and find out! You'll be toured around the trail with front-of-house views of the elusive clouded leopards, and will sneak a peek behind-the-scenes with slurping sloth bears and otters galore! Please note: This tour does not include giant pandas.

FEE: $130 per person
DATES: June 14 (Family), June 28 (Family), July 6 (Family), August 16 (Family), August 30 (Family), September 13 (Family), September 28 (Family)

Bird House Ever full of sights and sounds, a trip to the Bird House is not to be missed! Visit with your favorite feathered friends of all shapes and sizes, and learn about the incredible diversity of this winged animal kingdom from the keepers who know it best.

FEE: $80 per person
DATES: June 22 (Family), July 13 (Family)

MEHGAN MURPHY/NZP

Cheetah Conservation Station Are you as fast as a cheetah? Here's your chance to find out. Meet the cheetahs and some of their new African neighbors. See how they train the zebras and where it all comes together behind the scenes.

FEE: $130 per person
DATES: June 1 (Family), June 15 (Family), June 21 (Family), July 26 (Family), August 16 (Family), September 6 (Family)

Elephant Exhibit/ Commissary Feast your eyes on the Zoo's brand new Elephant Community Center and get an elevated view of their home sweet home during your keeper-led tour of the Elephant House. What does it take to feed a 9,000-pound elephant and all of the other 400 species of animals here at the Zoo? Detour to the Commissary and find out.

FEE: $130 per person
DATES: July 19 (Family), August 2 (Family), August 24 (Family), September 7 (Family), September 21 (Adult-only)

Great Cats/Farm Lions and tigers and cows, oh my! It's carnivore meets herbivore in this dual action overnight experience. Learn all about our feline royalty and see how the keepers care for these majestic, big cats. Then moooove on over to the Kids' Farm, sponsored by State Farm®, and receive a hands-on lesson in how to care for farm animals here at the Zoo.

FEE: $130 per person
DATES: July 12 (Family), July 13 (Family), July 19 (Family), July 20 (Family), July 27 (Adult-only), August 3 (Family)

Invertebrates Invertebrates are the most abundant creatures on the planet. They account for over 95% of all animal species, yet rarely receive their due praise. So join us for a look into the diverse world of these spineless wonders. Go eye to eye with a giant Pacific octopus and learn how to feed a sea anemone. From sea stars to cuttlefish, crab to butterfly, let them swim, crawl, and fly their way into your hearts.

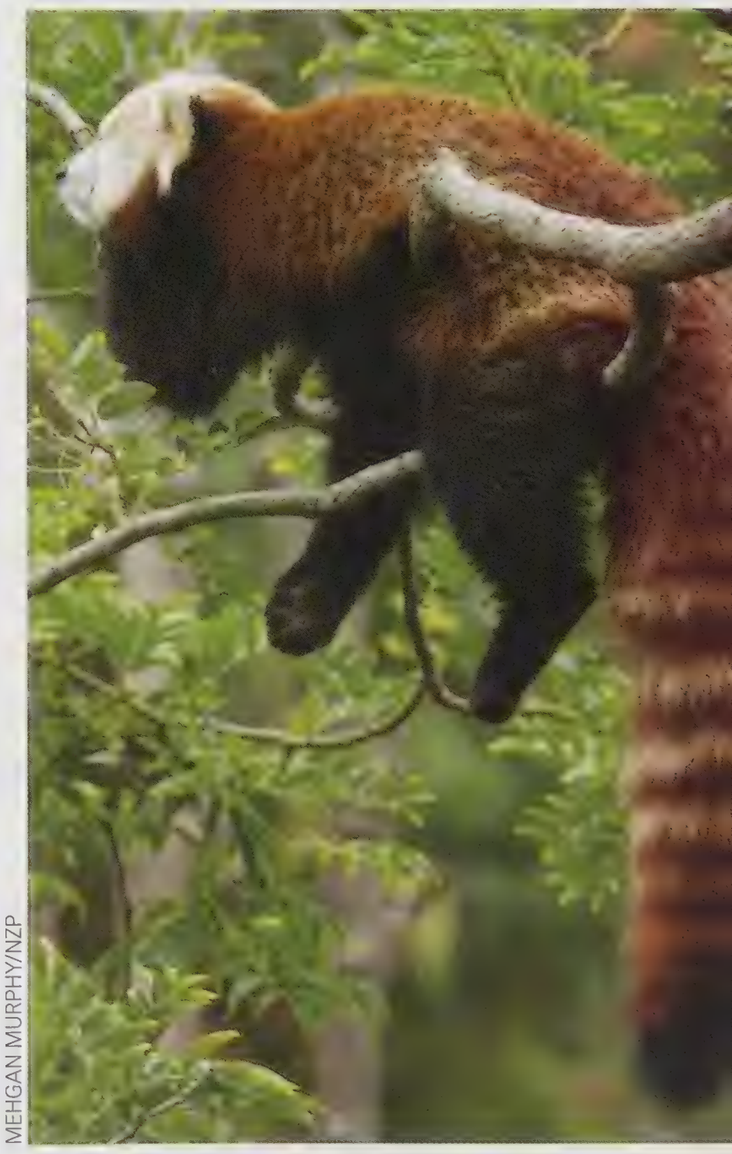
FEE: $80 per person
DATES: August 31 (Family), September 20 (Family)

Reptile Discovery Center A place where dragons still roam and alligators call home. Join us for one of the most interactive behind-the-scenes experiences available at the Zoo. You'll see tortoises grazing and get up close and personal with some of the coolest, scaly beings around. Don't miss it!

FEE: $80 per person
DATES: June 1 (Family), June 29 (Family), September 27 (Family)

Small Mammals There is never a dull moment at the Small Mammal House, with so many creatures there is always something to see! Join us for your chance to watch the sloths come to life, see enrichment at work, and meet a fury, little friend.

FEE: $80 per person
DATES: June 1 (Family), June 29 (Family), September 27 (Family)



MEHGAN MURPHY/NZP

MEHGAN MURPHY/NZP

Conservation Campouts

FRIENDS OF THE NATIONAL ZOO
conservation CAMP OUTS

Take in the beauty of the Shenandoah Mountains while enjoying a rare glimpse of the Smithsonian Conservation Biology Institute's headquarters in Front Royal, Virginia.

Your adventure begins with a keeper-led tour and continues with a campfire. Bunk in tents provided by FONZ, then rise for breakfast and a family-friendly activity.

Learn more and register at **fonz.org/conservationcampout.htm.**

AGES: Family tours ages six and older. Each group must include one adult for each three children. Adult tours 21 and older.

TIME: 5 p.m. to 10 a.m. the following day. .

FEE: Members: $115 per person. Nonmembers: $125 per person.

Tour Themes

A keeper will lead your group on one of the following two-part tours.

- **ADULT ONLY TOURS**
  - **Maned wolves and Endocrine Lab**
- **FAMILY TOURS**
  - **Cheetahs and Birds**
  - **Cheetahs and Hoof Stock**
  - **Leopards and Maned Wolves**
  - **Leopards and Birds**
  - **Black-Footed Ferrets and Hoof Stock**

FRIENDS OF THE NATIONAL ZOO
SCOUT SNOOZE ZZZZZ

Scout Snooze

Bring your troop for a wild night they won't soon forget! Where else in DC can you fall asleep to the sounds of sea lions barking and awaken to the calls of gibbons from their trees?

Your Scout Snooze includes an evening snack; a two-hour, keeper-led tour of an exhibit area; a flashlight tour of the Zoo; a morning breakfast snack; and an interactive activity.

Scout groups sleep in four or six person tents on Lion/Tiger Hill. Scout leaders are responsible for tent assignments.

Scout Snooze sleepovers are available to FONZ members only. To register, one adult per scout group must have a FONZ membership.

MEHGAN MURPHY/NZP

AGES: Children ages 6 and older. A paying adult must accompany all participants under 18, and one adult is required to chaperone every three children.

TIME: 6 p.m. to 9:30 a.m. the following day. A small snack is provided, but participants should eat dinner before coming to the Zoo. All Zoo restaurants close at 5 p.m.

FEE: $750 for up to ten people. $75 for each individual above ten. Maximum of twenty participants total (adults included).

Scout Snooze Programs

Each overnight includes a tour of one of the following areas. Visit **fonz.org/scoutsnooze.htm** to learn more.

- **Amazonia:** July 5, August 2
- **Bird House:** June 15, June 29, July 26
- **Invertebrates:** July 19, August 10
- **Small Mammals:** August 24, September 13
- **Reptile Discovery Center:** August 3, August 17, September 6

run Wild this summer

Nature Camp

Children entering grades 5-10 are invited to join FONZ for a summer of nature, science and wild discovery at the Smithsonian Conservation Biology Institute. Campers will meet Smithsonian scientists, enjoy behind-the-scenes tours and camp out under the stars.

Learn more and register for a wild summer of fun at **nationalzoo.si.edu/education/camps.**

sleep.

search.

save.

It's not too late to register!

FONZ MEMBERS ONLY: *Use discount code* **KIWI2013** *at checkout to receive the member rate!*

CONNOR MALLON/NZP

Black and White and Golden

Smithsonian photography intern, Connor Mallon, photographs animals throughout the Zoo, including this golden poison dart frog (above) and Grevy's zebra (right). Members of the FONZ Photo Club (right, inset), also often donate their stunning photographs for use in Zoogoer and other FONZ publications.

Cheetah cubs Justin and Carmelita had just been introduced to their neighboring yard when Mallon took his photograph of the wary zebra. "The zebra and the cheetahs were very watchful of each other," says Mallon. "They had several great expressions to share with me."

Technical Notes —

Frog
CAMERA: Nikon D5100
LENS: Nikkor 50/1.8;
ISO: 800

Zebra
CAMERA: Nikon D5100
LENS: Nikkor 70-200/2.8; ISO: 320

Smithsonian Zoogoer

welcomes FONZ members' submissions of photos taken at the Zoo. Please send photos to **Zoogoer@si.edu**. We will contact you if we are able to use your picture for the Zoo View page.

Join the Club!

Membership in the FONZ Photo Club is open to photographers of all skill levels. The group meets monthly to hear guest speakers and to share and discuss members' work. Learn more at ***fonz.org/photoclub.htm.***

CONNOR MALLON/NZP

MARK VAN BERGH

FONZ
Friends of the National Zoo

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Smithsonian
National Zoological Park

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Your membership supports animal care, science, conservation, and more.